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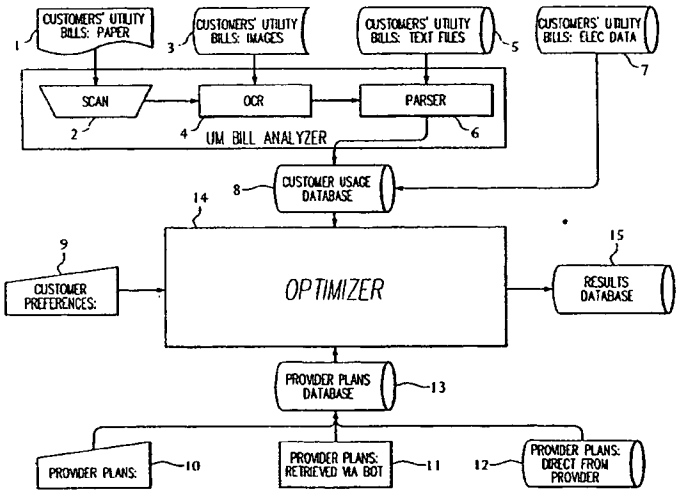

(57) Abstract: An apparatus and method (see Fig.1) for minimizing the total customer cost for bills by gathering usage information derived from customer's bills, and receiving one or more customer preferences (9), wherein said preferences comprise one or more geographical limitations, service provider limitations, anticipated usage patters, compiling a database of one or more service plans offered by one or more providers, generating in response to said customer preferences, a list of one or more service bundles for said customer, wherein said bundle optimizes a total amount due for all bills, and communicating said list to the customer for evaluation. The invention also teaches the ability of the service providers matching or bettering the competition's plans in order to keep the customer's business.

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APPARATUS AND METHOD OF OPTIMIZING THE TOTAL MONTHLY AMOUNT DUE ON BILLS AND SATISFYING CUSTOMER'S PREFERENCES

FIELD OF THE INVENTION

The present invention relates to systems and methods for bill payment. More particularly, the present invention related to automated methods and systems for evaluating service plans such as utility service plans and bundling service plans together in order to optimize payment terms.

BACKGROUND OF THE INVENTION

Service providers of all types of services, including but not limited to heating, water, electricity, telephone, mobile phone, pagers, beepers, mortgages, loans, on-line trading, groceries, and credit cards offer one or more service plans to customers. Customers need to evaluate the plans and often do so by guessing what their usage of the service is. For instance, the average customer merely guesses how much peak and off-peak airtime, and local versus long distance minutes he actually uses on his mobile phone, before he chooses a service plan. The present invention eliminates the guess work, and analyzes the customer's usage of these services and generates a list of the lowest cost plans and the bundles of plans with the lowest overall total cost that satisfy the customer's preferences. Further, the present invention allows for recurring analysis to occur based upon changes in the plans offered, the customer's actual service usage, and/or the customer's preferences.

Customers in today's market are subjected to numerous monthly bills for everything from utilities to mortgages to car payments, and for every bill, the customer must decide what service plan best fits his needs. The invention described herein allows a customer to evaluate the cost for each service plan which would fit his

needs, bundle service plans together in order to optimize payments which occur at regular time intervals, preferably monthly, and best match the customer's individual needs based upon the Customer's actual usage of the services. Further, it allows bundling of numerous customers' plans together in order to obtain discounts from the service provider. Additionally, the invention can analyze the Customer's usage and generate optimal plans on a recurring basis.

Currently in the industry there are service providers who gather information on their individual customer's usage from that specific service provider's bills. Some of these service providers gather this information on a recurring basis. Unlike these service providers' methods, the present invention is directed to optimization of plans for more than one service for each customer. The invention gathers information from bills from one or more providers other than the coordinator's bills; or from bills from the coordinator and one or more other providers. The coordinator may or may not be a service provider. Thus, this invention allows all of the bills from one or more service providers for a customer to be analyzed and optimized.

Other companies have tried to minimize a customer's utility costs but require the customer to answer lengthy questions about their usage of any service (which requires either time consuming, tedious work by the customer, or more likely, guesses by the customer). The present invention does not require the customer to guess or have any information other than copies of bills, and gathers the information required from these bills, rather than by questioning the customer.

SUMMARY OF THE INVENTION

In today's market, customers, both individual and commercial, ("Customers") enter into service plans ("Plans") with service providers ("Providers") for all types of services, including but not limited to heating, water, electricity, telephone, mobile phone, pagers, beepers, mortgages, loans, on-line trading, groceries and credit cards (collectively "Services"). Each Provider offers one or more Plans

from which the Customer must choose. The invention provides for the compilation of information based upon the Customer's actual usage of the Service, and an analysis of which Plans are best for the Customer. The Plans may be ranked according to total lowest cost or in any manner desired by the Customer. The Plans and Customers can then be automatically registered for Plans with the Providers. In addition, the invention allows for a reevaluation of the Plans at Customer's request or automatically in regular intervals to find the optimal Plans for the Customer for the most current usage information. Groups of more than one Customers' Plans may be bundled together under the invention to achieve group discounts from one or more Providers.

In the first embodiment ("First Embodiment"), the Customer desires to know his costs for any Plan that fits his needs, including usage patterns and Preferences, and/or desires that the overall total cost that he pays be optimized for all of the Services he uses each month or one or more particular bills each month. The Customer's services and costs are optimized by finding the lowest prices for the services that the Customer desires while accounting for the Customer's Preferences, if any. A coordinator ("Coordinator") gathers information from the Customer's bills, including but not limited to name, address, total costs, flat fees, usage-based fees (which are fees calculated from actual use of the Service), amount of usage for each Service, times of peak usage for each Service, and times of any usage of each Service (collectively "Information"). The Coordinator may or may not be a Provider. These bills provided by the Customer, Coordinator or Provider are bills from one or more of the following: the Coordinator and/or one or more Provider who is not the Coordinator (collectively "Bills"). The Customer supplies one or more customer's preferences, including but not limited to geographical limitations, acceptable Providers, unacceptable Providers, a desire to earn airline mileage rewards, a desire to give to particular charitable causes, and anticipated usage patterns (collectively "Preferences"). The Data of one or more Plans from one or more Providers, including

but not limited to flat fees, use-based fees, free Services, time limitations and rewards, are compiled into a database, which may be a real-time or stored database ("Database"). A database may be a commercial off-the-shelf or custom database and may be a relational, object-oriented or other database. The Customer Preferences and the information from the bills are analyzed, compared with the Database and a list of one or more service bundles ("Bundles") is generated ("List"). Each Bundle consists of one or more suggested Plans for different Services, which would optimize the total cost of all the Bills, or the specific bills that Customer wanted to minimize and satisfy the Customer Preferences. The List is communicated to the Customer via internet, intranet, electronic mail, regular mail, telephone, wireless devices, cellular technology and/or personal communication.

A separate preferred embodiment ("Second Embodiment") comprises the situation in which the Customer desires to optimize the overall total cost that he pays, including flat fees and use-based fees, for Services each month. A Coordinator automatically gathers Information from the Customer's Bills, including but not limited to total costs, flat fees, usage-based fees (which are fees calculated from actual use of the Service), amount of usage for each Service, times of peak usage for each Service, and times of any usage of each Service. The automatic gathering of Information may be accomplished by scanning Bills into a computer, converting the Bills into text format, preferably ASCII files, reading the text files of all the Bills, and having a computer automatically analyze the Bills for the information, or by electronically transmitting the Bills to a computer and have a computer automatically analyze the Bills for Information. The Customer supplies one or more customer's Preferences, preferably by internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication. The Customer Preferences and the Information from the Bills are automatically analyzed and compared with the Database and a List of one or more Plan or Bundle is automatically generated. The List is automatically communicated to the Customer

via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication.

Continuing in the same embodiment, the Customer may be dissatisfied with the List or desire to be informed of more or different Bundles. The Customer may optionally enter new Preferences ("New Preferences"), and have the Information and New Preferences analyzed and a different List generated. The steps in this paragraph may occur repeatedly.

A further embodiment ("Third Embodiment") encompasses the First or Second Embodiment with the following additions. After the completion of the First or Second Embodiment of the invention, the Coordinator automatically gathers Information from the Bills upon receipt of each Bill, at set time intervals or at the request of the Customer. The Bills are automatically evaluated to reveal any, if any, permanent changes in the Customer's usage patterns. If there are any permanent changes (that is, changes that are not just one month aberrations or are statistically insignificant), the changes become part of the Information, and the Information and Preferences (which may have been changed by the Customer) are compared to the Plans in the Database. The Database may or may not have had one or more new Plans added since the last evaluation for this Customer. A New List is automatically generated, and is automatically compared to the List which was generated in the last evaluation. The Bundles that are optimal due to the minimization of total costs and/or the ability to satisfy the Preferences ("Optimal Bundles") are designated, preferably automatically. If one or more Optimal Bundles are not on the List, these Optimal Bundles are communicated to the Customer. Optionally, the entire New List may be communicated to the Customer.

Another embodiment ("Fourth Embodiment"), which comprises alternatively the First, Second or Third Embodiment with the following additions, is described herein. After communicating the List or the New List to the Customer, the Customer directs the Coordinator to register the Customer for one Bundle. The

Coordinator may or may not ask the Customer for permission to contact the Providers, which the Customer currently uses ("Old Providers"). Optionally, the Coordinator contacts one or more of the Old Providers, preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication, and tells the Old Providers about the Plan or the Plans in the chosen Bundle for the Service they provide. Each of these Old Providers may or may not have the first right to retain ("Right to Retain") the Customer by matching or bettering the Plan ("Matched Plans") listed in the chosen Bundle. The Customer may or may not be able to decline the Matched Plans. Customer is enrolled, preferably automatically via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication or in one or more Plans from the chosen Bundle with one or more Providers or optionally, for one or more Matched Plans.

The invention is encompassed in a further embodiment. After the First, Second, Third or Fourth Embodiment, the Coordinator may coordinate payment for the Customer to each Provider to which the Customer owes money. This coordination may include one or more of the following: receiving the Bills, communicating the Bills to the Customer, paying the Bills and billing the Customer or receiving funds or access to bank accounts from the Customer to pay the Bills. Further, the Coordinator may optionally audit the Bills upon receipt for any errors. If there are any errors in the Bills, the Coordinator may optionally try to negotiate with the Provider to correct the error or communicate the error to the Customer.

A further embodiment of the invention comprises receiving the Information from the Bills transmitted to the Coordinator, by either the Provider or the Customer, in an on-going basis. Coordinator gathers Customer's Preferences, preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication. The Information and the Preferences are automatically analyzed, preferably with parametric or nonparametric statistical

estimation, and the results are stored in a database, which may be a real-time or stored database. One or more Plans may or may not be eliminated from the potential Plans which may be evaluated to determine whether they are optimal for the Customer, due to Information which will not be adequately covered by one or more particular Plans or due to the fact that in prior analyses for this Customer revealed that one or more particular Plan was unacceptable due to Information or Preferences. One or more Plans may or may not be added to the Plans considered in the evaluation, depending on whether the Plans could satisfy the Preferences and cover the Services required by the Information. A List is generated from the remaining Plans which optimize the total costs and satisfy the Preferences.

Another embodiment of the invention is similar to the embodiment in the previous paragraph, with the following changes. Upon receiving the Bills, the Coordinator automatically statistically analyzes the Information and the Preferences, preferably with parametric or nonparametric estimation, and the results are stored in a database, which may be a real-time or stored database.

An additional embodiment of the invention allows the Coordinator to satisfy the Customer's Preferences and generate the List without processing every possible Plan for every Customer. The Coordinator compiles all of the usage Information from one or more consumers, which may or may not be Customers (preferably a statistically significant number of consumers) for a particular Type of Service (this may be accomplished for each Type of Service individually) into a distribution of number of consumers that use a specific amount of the Service (for example, how many consumers use particular amounts of minutes on a cellular phone). Statistical analyses, preferably parametric or non-parametric, generate distributional models of usage Information ("Models"). This will allow the Coordinator to predict that a significant number of consumers use a specified range of cellular phone minutes ("Specified Range"), for instance 80% of consumers use between 20 and 200 minutes on a cellular phone each month. The Models are

employed in conjunction with Plan Data and further statistical analyses, preferably parametric or non-parametric, to identify Plans that are statistically unlikely to satisfy any given Customer (e.g. Plans which do not offer Service coverage in the Specified Range). The Plans that are unlikely to satisfy may or may not be eliminated as possible solutions for each Customer. If no Plans or Lists are generated that will satisfy any given Customer, any Plans that had been eliminated from consideration may or may not be considered in another optimization step.

In another embodiment, the optimization algorithms are linear in time with respect to the number of available Plans. In a real-time system, more than one Customer may be able to request an optimization of Plans simultaneously, requiring a unique optimization on the entire list of available plans for each requesting Customer. This real-time model scales well as a consequence of highly efficient optimizer algorithms. However, if the Coordinator received a high number of requests from Customers and/or a high number of new Plans, a real-time system may not be able to process the requests simultaneously, depending on the hardware and /or software capacity. Another subsystem ("Comparer") may be used as a floodgate during the transitional phases when backend systems are inadequate for the real-time demands. The rationale behind the Comparer is that if some of the plans from the list of plans to consider could be eliminated, the optimization would take less time, preventing the system from crashing until either the volumes of Customer requests and/or Plans decrease, or a long term solution can be implemented.

In this same embodiment, there are two methods by which the Comparer is able to eliminate Plans from consideration in the optimization process. First, the Comparer may eliminate all those Plans which are absolutely inferior to some other Plan. Absolute inferiority denotes a state wherein no fiscally rational person would select a particular Plan because a second particular Plan would be less expensive for any Customer. This requires the existence of two plans with exactly the same characteristics so that any Customer, whatever his Preferences, would

consider the two Plans equivalent on all bases other than price. (For instance, Company A offers 100 free cellular minutes at anytime for $40/month and $1/extra minute and Company A offers another Plan for 100 free cellular minutes at anytime for $60/month and $1/extra minute, then this analysis may eliminate the second Plan from any further analysis with regard to every Customer.) Somewhat surprisingly, this absolute inferiority of Plans occurs fairly frequently, usually when Providers are making an attempt to phase out an older Plan and introduce an identical, yet less expensive Plan.

A second way to reduce the number of Plans considered for each Customer's optimization, in the same embodiment, has also been invented. The rationale behind this method stems from the following question: "If one Customer was selected at random, how likely would a given Plan be to suit this Customer's needs?" To answer this question, preference and usage profiling are employed to create statistical models of the distributions of both. Preferences and usage have both been found to have roughly normal statistical distributions, thereby forming a bell curve when volume of usage or degree of preference is plotted on the horizontal axis and the number of customers with such usage or preference level is plotted vertically. If a Plan is to perform well for the average Customer it must have certain characteristics, depending on the particular distribution for a given Type of Service. For example, if the standard deviation is large for service usage (i.e. the normal curve has a wide base), a Plan must be fiscally attractive for most of those usage levels to be considered desirable for any randomly selected Customer. On the other hand, if the standard deviation is low (i.e. the normal curve has a narrow base) a Plan must be fiscally attractive for those usage levels centered around the peak of the curve if it is to be considered good for any randomly selected Customer. In trying to predict the usage of the next Customer, prediction intervals on the aggregate data are appropriate metrics for the uncertainty of this particular statistic. Usage, a random variable with a normal distribution, must be linearly transformed, resulting in another

random variable with a normal distribution. The true value of the random variable is unknown, which requires the use of a point estimator for each Plan, employing data collected from the current Customers or other sources. The minimum variance unbiased estimator (MVUE) is constructed using standard methods and the prediction interval is calculated on that statistic. This point estimator gives a reasonable estimate of the true cost of a particular Plan to the next Customer, and the corresponding prediction interval captures the uncertainty of that estimate. A summary statistic that accounts for both usage breadth and total cost factors is then constructed and used as an index for sorting Plans. By considering only those plans within a particular number of places from the top of the sorted list, the Plans considered in each optimization may be arbitrarily limited ("Reduced List"). After considering all those Plans on the Reduced List, the remaining Plans may be considered, if desired.

Calculating the potential costs incurred by a Customer is addressed in another embodiment of the invention. A Database is generated which includes one or more variables of one or more Plans offered by one or more Providers, including but not limited to peak time fees, off-peak time fees, flat fees, free usage, rewards, and geographic limitations. The Customer's Information is compiled from the Bills, while one or more Plans are designated as a potential solution set ("Solution Set") for the Customer. The estimated costs for the Customer for each Plan in the Solution Set is determined based upon the Information.

A method of ranking the Plans is embodied in a further embodiment, which comprises the following additional steps in addition to any one of the other embodiments. The Customer lists his output requirements ("Requirements"), including but not limited to lowest monthly bill, airline reward programs, best Plan for each Service, no minimum time period for the Plan, no penalties to terminate the Plan and listing all Plans. These Requirements determine how the List is generated and presented to the Customer. For example, if the Customer lists airline reward

programs in the Requirements, then the List communicated to the Customer would list the Bundles with airline reward programs first. The Coordinator would automatically have the Bundles analyzed and ranked to display what the Customer requested in the Requirements.

BRIEF DESCRIPTION OF DRAWINGS

The invention will become more readily apparent from the following description of preferred embodiments thereof shown, by way of example only, in the accompanying drawings wherein:

Figure 1 is a flowchart of an embodiment of the invention, which displays the steps in the inventive process.

Figure 2 is a flowchart of another embodiment of the invention, again detailing the steps of the inventive process.

Figures 3A-3C represent a flowchart of yet another embodiment of the invention, which details the steps of the inventive process.

Figures 4a-4b display another embodiment of the invention in flowchart form.

Figure 5 is a block diagram of an apparatus embodiment of the invention.

Figures 6a-6b represent a flowchart of another embodiment of the invention, again detailing the steps of the inventive process.

Figure 7 is a flowchart of another embodiment of the invention.

Figures 8a-8b depict a flowchart of another embodiment of the invention.

Figures 9a-9h display the files and fields of a database in an embodiment of the invention.

Figure 10 is a diagram of the structure of a database of an embodiment of the invention.

Figures 11a-11b depict a table of tags used in one embodiment of the invention.

Figure 12 depicts an example of the Parser output.

Figures 13a-13b depict sample information input into and sample results generated from the invention.

Figures 14a-14h is a copy of a sample Bill.

Figures 15a-15r depict a sample descriptor file in the Parser of the invention, and a sample bill for wireless phone service.

DETAILED DESCRIPTION

A preferred embodiment of this invention is shown in Figure 1. The Customer, an individual or business, provides the Coordinator with copies of his bills for any services or the Bills are obtained directly from the Provider, in paper form (1), in image form (3), in text format (5), or electronic format (7). The paper bills (1) are scanned into a computer in step (2), and then both the scanned bills from step (2) and the bills in image format undergo optical character recognition processing ("OCR") in step (4). After step (4), the OCR's results and the bills in text format are parsed in step (6) for usage information, including but not limited to one or more of: peak time usage, off-peak time usage, flat fees, and penalties. The results of step (6) and the bills in electronic format are added to the Customer Usage Database, which may be real-time or stored, in step (8).

Further, in the same embodiment, the Customer communicates his Preferences to the Coordinator. In step (9), the Preferences are input into the Customer Preferences Database, which may or may not be the Customer Usage Database. In order to complete the input of information which is required for the invention, Providers communicate the data ("Data") of the Plans, preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication. These Data may include but are not limited to one or more of: flat fees, peak times, peak time fees, off-peak time fees, rewards and

penalties. Since these Data may be provided in hard copy form, via information posted on the internet or directly from the Provider electronically, in step (10) the hard copy Data are manually input, in step (11) the internet Data are retrieved via an automated program, preferably a bot (a program that performs a repetitive task on a network), and in step (12) the Providers directly provide the Data electronically to the Coordinator; and the Data are placed in the Provider Plan Database (13), which may or may not be the same as the Customer Usage Database.

The Customer Usage Database, the Customer Preferences Database, and the Provider Plan Database are all accessed for analysis in step (14). In an effort to satisfy the Preferences based upon the Data and the Information, optimal Bundles of Plans are generated and compiled in Step (15) in the Results Database, which may or may not be the same as the Customer Usage Database, the Customer Preferences Database and/or the Provider Plan Database.

Referring now to Figure 2, a separate embodiment of the invention is demonstrated. The Preferences input into the Customer Preferences Database is used to compile a rules engine ("Rules Engine" 19). Since Preferences can take a wide variety of forms and encapsulate an infinite set of gradations of intensity, a system of accounting for Preferences is necessarily complex. The most difficult task is determining how to fairly weigh competing and possibly conflicting Preferences against each other. Furthermore, there is the problem of how to weigh non-financial Preferences against cost considerations. To solve these problems and minimize the possibility of strong other Preferences completely dominating cost in the ranking process (as later discussed), all Preferences are combined into a single weight factor by which the total cost of the Plan is multiplied before ranking. Applying these Preferences to the cost is not a simple matter, because storage limitations prohibit the storing of separate, Preference-weighted plans for every customer. Consequently the Preferences and their weight must be applied real-time. Furthermore, Preferences are exceedingly difficult and awkward to store in a database, since multiple conditions

combined with boolean operators and the corresponding actions would require many records in several linked tables for each Preference of each Customer. Consequently, database access and data transfer times would be excessively large. After the Customer inputs the preferences, the system encodes them. Individual Preferences are represented by individual Preference language statements, and the collection of statements for a single Customer is stored in a text file on the server. Running in parallel with the Optimizer is a real-time programming language interpreter that decodes Preferences and applies the Preferences to the data model in memory. After checking any desired Plan characteristic, the Preference statement may eliminate a Plan from the list of Plans to be considered, change its Preference weight factor (for instance, if Customer prefers Company A, then Company A's Plans may be weighted heavier than the same Plan offered by Company B) or even change any Plan characteristic for the current optimizer execution (allowing the creation of hybrid or altered Plans provided the Providers can provide such Plans). Consequently, as Plans are loaded and checked for optimization, the Rules Engine applies Preferences in parallel which allows the Ranker to make recommendation decisions based on the weighted Preferences. In addition to applying Customer Preferences, the Rules Engine may be used to dynamically change plan characteristics. For example, if a Provider allows rate schedules to change if a particular Plan is bundled with another, that change can be made using the Rules Engine in real-time.

Upon the compilation of the Rules Engine (19), the Rules Engine works in connection with a comparer ("Comparer") (21) which automatically performs non-statistical, or preferably statistical, analysis of the best Plans for the Customer's usage. Upon receipt of new Bills from the Customer or upon request by the Customer, preferably via the internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication, the Comparer will reanalyze the Preferences and Information. Over time, the Data regarding a particular Customer and his analyses accumulates, allowing the Comparer to eliminate certain

Plans from the analysis due to their inability to satisfy the Preferences or the Customer's usage. Further, in this same embodiment, the Information in the Customer Usage Database (18) is aggregated and processed into a set of fields, which are comparable for all Plans from any Provider, by a processor ("Processor") (22), which is preferably a computer-based analysis.

Continuing with the same embodiment, the Rules Engine (19), the Comparer (21) and the Processor (22), all provide information for a cost calculating analysis ("Cost Calculator") (23). After the Rules Engine (19) and the Comparer (21) have narrowed the set of possible Plans, the Cost Calculator determines the total cost that the Customer would have incurred for his current usage patterns for every Plan in the set. Hundreds of variables (for example those listed in Figures 9a-9h and described below) in the Processor are matched with the Data of each Plan. For example, the Cost Calculator will determine costs for long distance telephone service by considering one or more of the following factors, including but not limited to intra-state, inter-state, peak, off-peak, and weekend costs, taxes, monthly fees, surcharges, and free minutes.

After the Cost Calculator is finished processing, in the same embodiment, the Bundles of Plans are ranked according to the Customer's Requirements, or total monthly cost by the process called the Ranker (24). In the next step, the results from the Ranker are input into the Results Database (25), which may or may not be different from the Customer Usage Database, the Customer Preferences Database, or Provider Plans Database. Once the Customer receives the Ranker's results, the Customer selects its Bundle. Information about the Customer is given to the Provider, preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication, so that the Customer can be enrolled for the Plan with the Provider. This whole process is noted as the Coordinator Process (26). Data about the Plan are stored in the Customer Usage Database (18) for future comparisons.

Figures 3A-3C depict another embodiment of the present invention. Customer Bills are provided to the Coordinator (27). Any Bills that are in paper form (28) are scanned into a computer (29) and converted to image files (30), which are then converted to text files by OCR (31). Other Bills may or may not be provided as image or text files. The text files (32) are processed by a parser ("Parser") (33) to aggregate and process the information into a set of fields of electronic data (34) that are comparable across all provider plans (some of these fields are further described in the description of Figures 9a-9h below).

Usage information of Customers may come from a variety of sources, both digital and hardcopy. The digital information may be processed in the Parser (33). The Parser is capable of extracting all useful usage information from a standard electronic bill whether it is in ASCII plain text, HTML, XML or some other representation. The general problem, which is solved by the Parser, results from the fact that within a standard bill, there exists much useful information dispersed among relatively worthless garbage text, primarily used for advertisements, service notices, formatting and aesthetics. The task of the Parser is to sort the useful from the useless information and organize the useful information into a usable form. Parsing the entire bill, including large unnecessary text blocks would require natural language processing algorithms which are incredibly complex and notably slow. The Parser in the invention however, recognizes the Bills as nothing more complex than a context free grammar.

A Context Free Grammar is a linguistic construct that describes a language wherein every symbol in that grammar has the same meaning, regardless of its position in any given document. While this restriction may seem crippling, this construct may be used so that context dependent symbols may be disregarded in Bills. Formally defined, context free grammars are 4-tuples:

(§, V, S, R) wherein

- § is the alphabet, in this case the English alphabet including the arabic number set and standard punctuation.
- V is the set of all nonterminals. These non-terminals or variables describe grammatical structures that store information and encode context. They consist of symbols from the alphabet in possible combination with other nonterminals.
- S is the start variable or the first non-terminal that the Parser attempts to recognize.
- R is the set of rules that define the composition of each nonterminal. Each nonterminal may have multiple rules defined in R.

By flagging certain symbols as having possible contextual ambiguity, the problem of context dependency can be avoided. A special non-terminal ("Garbage Text") may be defined to handle miscellaneous data having little or no importance to the invention, for example, advertisements or notices of service modifications have no meaning to optimization, yet may complicate the process of the Parser significantly since Parsers may be written in natural language. Paragraphs of Garbage Text are the only sections of a Bill that might call into question the assumption of context independence. Fortunately, this Garbage Text may be ignored. If any flagged symbol appears in a position that makes its meaning uncertain and the Parser defines this flagged symbol as Garbage Text, that data may be ignored. Even if the Parser does make a mistake in designating or not designating Garbage Text, the worst case scenario is a Parser error, rather than lost or corrupted data. In this way, Bills may be treated as context free grammars and processed by the Parser accordingly.

All important keywords will only appear where they should. In any cases where keywords have multiple meanings depending on position, the situation can be resolved through brute force methods. Since bills are context free grammars, it is possible to parse them using standard programming language compiler techniques. Due to its speed and error robustness, an LALR (look ahead left

recursive) algorithm may be used for the Parser. To implement this part of the invention, a parser generator developed by the Free Software Foundation (FSF) known as Bison and a lexical analyzer generator developed also by the FSF known as Flex may be used. One problem to be solved in the Parser is the entry of new Bill types. Entering grammar descriptions directly using the Bison grammar descriptor format would require significant technical knowledge and professional level expertise with the C programming language. In order to make Bill entry as easy as possible, an XML language may be defined that has several predefined tags (see Figures 11a-11b) for denoting specific predefined grammatical constructs and a considerable amount of flexibility in defining new structures. This language is based around Bill structures, not data structures. Consequently, it is simple for the person who is administering the entry of new Bill types to understand and to use. The XML document (seen in Figures 15a-15c) may be processed and used to generate the input files for Bison and Flex which then generate code for the Parser.

Continuing in the description of the same embodiment of the Parser, after creating a Parser, which may or may not be the same as another Parser, for each bill type (e.g. a Bill for a Particular Plan or Provider), upon receipt of a Bill, each of the Parsers could simply be tried successively until one of the Parsers returned an output without an error. Since the LALR algorithm is able to exit at the soonest possible time after an error is found, this solution becomes extremely efficient since most incorrect Parsers will fail before the first 10 to 20 tokens have been parsed. In addition, using information passed along with the bill by partners, such as provider name and customer account number, the list of possible bill types to consider can be greatly reduced.

A sample long distance phone Bill is depicted in Figures 14a-14h. An example of the Parser's output (from the Bill in Figures 14a-14h) is displayed in Figure 12. As in the previous embodiment, the electronic data is then compiled into the Customer Usage Database (35).

In the Customer Usage Database (35) step, the output of the Parser may be processed to verify whether Customer is a new or existing customer of the Coordinator. Each new Customer may have a new subscription record created. Then the output of the Parser is identified by Type of Service and grouped into subsets of information (e.g. for a long distance phone Bill, in-state calls may be grouped separately from state-to-state calls). This information may be aggregated to record certain enumerated information in the Database (e.g. the top 20 phone numbers called, the tope 10 states called).

Continuing in Figure 3B of the same embodiment, the Data about the Provider Service Plans (36) are gathered from paper descriptions (37) or telephone discussions (38), which are both manually input (41) into the Provider Plan Database (44), or from Internet websites (39) owned by the Provider, which may be manually input (41) or retrieved via Bot (42) for the Provider Plan Database (44). Additionally, the Data may optionally be provided through electronic data (40), which may be automatically downloaded (43) to the Provider Plans Database (44).

As seen in Figure 3C of the same embodiment, the Customer inputs his Preferences preferably by the Internet. The Rules Engine (48) processes the Preferences and defines parameters which are required for any Plan to be considered. The Rules Engine processes the Plans in the Provider Plans Database (49), and eliminates any Plans which will not satisfy the Preferences. The Customer Information is also processed by a processor ("Processor") which compiles the Information into fields which are common among the Plans for each Service (45). For example, long distance telephone service usage may be distributed into 15-minute groups or buckets over a month. Figure 13a depicts a snapshot of the sample Bill's information input into the Processor and the details captured in 672 15-minute buckets over one month. This Information is further processed by analysis, preferably statistical or non-statistical, either parametric or nonparametric, in order to determine what types of Plans would satisfy this Customer's usage (46). Both results

from step (46) and step (49) are processed, preferably automatically in order to calculate the cost for the Customer's usage under each Plan which would satisfy the Preferences and Information (50). Figures 13a-13b detail a sample output from the cost calculator step (50). The output of step (50) may be further processed so that the Bundles will be ranked according to lowest total cost, preferably monthly cost (a sample of which is depicted as output of the Ranker in Figure 13b). The results of this ranking are stored in the Results Database, which may be real-time or stored (52). A sample of the overall output is depicted in Figure 13b. In this embodiment, the Coordinator optionally facilitates the Customer enrollment in the new Plans with one or more Provider (53), this facilitation may include one or more of: contacting the Provider, gathering data about the Customer for the Provider and agreeing to have the Provider change the Service to the new Plan, on the Customer's behalf. Preferably, this facilitation may be accomplished via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication with the Provider.

Figures 4a-4b display another embodiment of the invention. In step 54, the Customer's Bills are gathered from the Customer or the Provider and the Information is culled from these Bills, as set forth in the other embodiments. The Customer gives his Preferences to the Coordinator preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication in step (55). The Provider's Plans and the associated Data are compiled into a Database in step (56). Using the Information, Data and Database, a List of Optimal Bundles is generated (step 57), and in step (58) is communicated to the Customer preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication. The Customer reviews the List and chooses a Bundle in step (59). Then the Coordinator contacts each Old Provider for each Plan on which Customer is currently enrolled, to inform the Old Provider about the new Plan that Customer desires in step (60) ("New Plan"). The

Old Provider may have the right of first retention, and will keep the Customer if the Old Provider matches or betters the New Plan (in step (61)). Optionally, the Customer may change Providers even if the Old Provider matches or betters the New Plan.

Another, separate embodiment is represented in Figures 6a-6b. In step 74, the Customer's Bills are gathered from the Customer or the Provider and the Information is culled from these Bills, as set forth in the other embodiments. The Customer gives his Preferences preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication in step (75). The Provider's Plans and the associated Data are compiled into a Database in step (76). Using the Information, Data and Database, a List of Optimal Bundles is generated (step 77), and in step (78) is communicated to the Customer preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication. The Customer or Provider provides new Bills to the Coordinator, and the Coordinator gathers Information from the New Bills in step (79) (as in step (74)). The New Information, new Plans and new Preferences, if any were provided by the Customer, are evaluated in step (80), and a new List of Bundles which satisfy the new Preferences and New Information is generated in step (81). The New List and the List are compared (82) so that one or more Optimal Bundles may be designated (83). If any of the Optimal Bundles are not on the List, those Optimal Bundles (optionally, along with all the Optimal Bundles) are communicated to the Customer in step (84).

The invention is manifested in another embodiment represented in Figure 7. The Bills are received and the Information is gathered from the Bills (85) as described in other embodiments. Similarly, the Preferences are received (86) as described in other embodiments. The Information and Preferences are statistically analyzed (87), as also described in previous embodiments, and one or more databases, which may or may not be the same as other databases used in this embodiment, of the

results are generated (88). One or more Plans may be eliminated as a possible solution for the List if the Plan(s) do not satisfy the statistical or other requirements (89). From the Plans not eliminated, a List of Optimal Bundles is generated in step (90).

Continuing in the description of the invention with another embodiment, Figures 8a-8b represent yet another embodiment. In step 91, the Customer's Bills are gathered from the Customer or the Provider and the Information is culled from these Bills, as set forth in the other embodiments. The Customer gives his Preferences preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication in step (92). The Provider's Plans and the associated Data are compiled into a Database in step (93). Using the Information, Data and Database, a List of Optimal Bundles is generated (step 94), and in step (95) is communicated to the Customer preferably via internet, intranet, electronic mail, telephone, wireless devices, cellular technology and/or personal communication. The payments for the Plans are coordinated for the Customer in step (96), so that Customer may receive one or more bills from the Coordinator for one or more Plans, and the Customer may direct the Coordinator to pay the Provider Bills, while the Customer pays the Coordinator. The Bills may be audited for errors in step (97), and if one or more error is found, the Coordinator may contact the Provider about the error (98). The Coordinator may or may not obtain permission from the Customer to negotiate and then attempt to negotiate with the Provider on the Customer's behalf regarding the error in step (99).

Figure 5 represents another embodiment of the invention. The other embodiments of the invention are preferably computer software which is implemented on the apparatus represented in Figure 5. The Customer's Communication Device (62) is preferably a computer, telephone, wireless device, cellular phone or other media employed to communicate Information, Preferences and any Customer input to (67) or receive Lists or inquiries from (68) a Network (63).

The Network is a group of computers and associated devices that are connected together by permanent connections, such as cables, or temporary connections, such as telephone links. The Network is preferably internet including the Web, on-line services, such as America-On-Line, intranet, local area networks, wide area networks, telephone system, wireless or cellular network or any media network.

Further in this embodiment, the Provider's Communication Device (65) is preferably a computer, telephone, wireless device, cellular phone or other media employed to communicate the Plans to (74) or receive enrollment information or right of first retention information (73) from the Network. The Information, Preferences, Plans, Lists and other communications from the Customer or Provider are sent (70) to one or more Servers (64). The Servers are mainframe computers, minicomputers, microcomputers (including personal computers or workstations) or other computers serving as a repository for data gathered and are preferably owned and/or operated by or on behalf of the Coordinator. The Server then sends the Information, Preferences and Plans (71) to one or more Databases (66), and the Databases supply the same to the Servers when needed (72). Finally, the Servers communicate Bundles and Lists to the Network (69) for transmission to the Customer's Communication Devices (67); and Bundles, Lists, enrollment information, and first retention information to the Provider's Communication Device (73).

Figure 10 depicts the structure of the Database described in Figures 9a-9h. Figures 9a-9h depict the data which may be contained in the Customer Usage Database (8), the Customer Preferences Database (9), the Provider Plans Database (13) and the Results Database (15). One or more of the following files and one or more of the fields may be included in one or more databases in this invention. The file Address (100) may contain one or more of the fields (100a-100h) which comprise a Customer identification number, address type or format of the address, a designation of the Customer's state, and Customer address information. Further, the

Customer file (105) and Customer_Phones (106) for each Customer includes the fields (105a-105n) for the Customer's identification number, name, social security number, email address(es), title, suffix, date of first using the Coordinator, driver's license number, state, birthdate, and password, and the fields (106a-106f) with type of phone (for example landline, cellular, wireless), area code, hours of availability, phone number and extension. Any preferences entered by the Customer may be stored in the Preferences file (120) with fields (120a-120e) of the Customer's identification number, Provider identification number, type of Service, whether the Customer prefers to save on a particular Service or on the overall package of Services. Agg_Usage (101) is a file that contains one or more of the fields (101a-101h) which includes the identification assigned each of the particular Service Plans in which the Customer is currently enrolled, the type of Service (for example electricity, gas, water, telephone), the date of the Bill provided, the country in which the Service is rendered, the amount of the Bill, the number of minutes a Service is used by Customer, the dollars billed to the Customer, the account number or phone number in the value field, the number of calls. The fields (102a-102b) in the Area_Codes file (102) store data of the area code of the Customer and links to the jurisdiction identification file, which limits the location of the Customer to help eliminate any inappropriate plans and calculate the relevant costs of Plans. Each state is assigned a code and that is stored in the State file (128, fields 128a-128b). The zip codes are stored in the Zip_Codes file (140), and each zone's information is stored by type of record (for instance state), value of record (for instance Pennsylvania) and jurisdiction identification in the fields (141a-141c) of the Zones file (141). Data regarding Bundles are stored in the Bundles file (103), and include (in fields 103a-103f) an identification number assigned to a particular Bundle, the date on which the Bundle can first be offered to Customers, the name of the Bundle, the last date on which the Bundle can be offered, the flat fee if any associated with the Bundle, and a

designation of commitment (e.g. what penalties are incurred if a Customer changes a Plan before a specified time).

Each Provider's information will be stored in the Provider file (122) with one or more of the fields (122a-122l) including an identification number assigned to the particular Provider, a code of the state in which the Provider offers Plans, the Provider's name, address, the Parent Provider identification (this tracks the parent company, which offers each particular Plan), the website, phone number and a code to be used with any Plan from the Provider which is coordinated by Coordinator (so the Coordinator may be credited with bringing the Provider business). For each type of Service, there is a Types of Service file (134) which includes the type of Service and a description of that Service in fields (134a-134b). The Provider is linked to its Type of Service in the fields (135a-135b) of the Types_Of_Service_Provider file (135). Each type of rate scheme (for example, by the minute, flat fee, including certain peak and off-peak minutes) is stored in a Rates file (125) with the fields (125a-125e) with an identification number assigned to this rate scheme, with start and end dates of the scheme, the type of Service, and any fixed fee. The Rates_Schedules file (124) stores the variable rate information for a particular Plan, while the Rates_Repeating file (126) stores the constant rate information (126a-126c) for a particular plan. The Sequence_gen file (127) generates sequences used to assign unique identifications for each identification field (127a-127b). The Rates_Schedule_Aggregate file (123) stores the aggregate rate information of a particular Plan (e.g. number of free minutes) (123a-123c). When the Data of the Provider's Plans is provided, it is stored in the Plans file (118) with one or more of the fields (118a-118i, 118l-118q) including an identification number assigned to the Plan, an identification number assigned to the provider, the type of Plan, a description, whether the Plan must be offered with other Plans, the start and end date when the Plan is offered, Rate identification (which relates the file to other files with rate information for the Plan), timeschedule identification, the name of the Plan, type

of Service, and whether the Customer has been enrolled. If a Plan has more than one sub-Plans offered, this information may be included in the Plans file. Each Plan may be limited in geographic scope, which would be stored in the Plans_Coverage File (119) which includes the fields (119a-119e) of an identification of the jurisdiction (or geographic scope), the start and end dates of the Plan, the identification of the Provider, and the Plan identification number. On occasion, a Provider may offer a promotion associated with a Service, and that Data may be stored in the Promotion file (121) with the fields (121a-121g) including an identification number assigned to that particular Promotion, an identification number for the Bundle in which the Promotion is included, the Promotion name, the monetary amount of the Promotions, the start and end date of the Promotion, and a description of the Promotion. Some of the Provider's Data is stored in the Feature_Master (108) file with the fields (108a-108c) for the identification of the feature file, the type of Service and the name of the feature offered in the Plan by the Provider. The Features_Plan (110) file stores the date for each Plan, including the fields (110a-110g) of the start date for each feature (for example amount of peak minutes included in the flat rate for a particular telephone service Plan), the type of Service, the feature value, which is the dollar value of the particular feature in that Plan, the end date for each feature, the identification number, the Provider identification and the Plan identification number. The Jurisdiction File (111) also stores data in the fields (111a-111b), as does the Levels File (112) with fields (112a-112e), which addresses any variations in rates above or below a specified level of usage. Any taxes associated with each particular jurisdiction is stored in the Taxes_Tariffs file (130) with the jurisdiction identification and identification assigned to the tax in the fields (130a-130b).

Once a Customer has made a choice of Plans, the Choice file (104) has a list of all the Plans and Bundles of Plans which can be offered to the Customer. The Orders file (115) may store the fields (115a-115k) including the identification number assigned to this particular Customer's order, the Customer's and Provider's

identification numbers, the date on which the Order was placed with the Provider, Customer's credit card type, number, and authorization, amount of the order, expiration date for the credit cards, status of the order and a reference number assigned to this Order. If the Customer has selected on or more features, the data is stored in the Features_Customer_Bundle file (109) with the fields (109a-109f) for the Provider's identification number, the type of Service, the end date on which the Customer will cease receiving the Feature, the identification for the Customer's enrollment in the Plan, the identification number of the Plan, and the identification number associated with the Feature_Master file. Once the Customer is enrolled in a Plan, the Subscriptions file (129) stores fields (129a-129i) which may include the start date, Plan identification number, end date, term of the enrollment, account number, an identification assigned to the Subscription, the Provider identification, Order and Customer identification.

As the Coordinator receives the Bills of the Customer, the information regarding the Customer's usage will be stored in Usage_Detail (136) in fields (136b-136g), the year, number of week, number of units used, an identification number assigned to this Bill's usage, the identification of the Detail file, and the associated Subscription identification. The Usage_Master (137) captures a Customer's usage for a Type of Service. The Usage_Running_Avg (138) comprises the master table of 672 (15 minute groupings) identifications for the detail records of usage over an entire month, while User_Running_Avg_Detail (139) comprises the 672 detail records of usage.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes of the invention. Accordingly, reference should be made to the appended claims, rather than the foregoing specification, as indicating the scope of the invention.

What is claimed is:

1. A method for minimizing total customer cost for bills, comprising:

gathering usage information derived from a customer's bills;

receiving one or more customer preferences, wherein said preferences comprise one or more of the group consisting of geographical limitations, utility provider limitations, and anticipated usage patterns;

compiling a database of one or more service plans offered by one or more providers;

generating, in response to said customer preferences, a list of one or more service bundles for said customer, wherein said bundle optimizes a total amount due for all said bills; and

communicating said list to said customer for evaluation.

2. The method of claim 1 further comprising:

automatically gathering said usage information upon receipt of each bill;

automatically evaluating said usage information with new preferences resulting from one or more permanent changes in a usage pattern;

automatically generating a new list of one or more service bundles, said bundles optimize a total amount due for all said bills and satisfy customer preferences;

automatically comparing the list and the new list;

designating one or more optimal service bundles; and

communicating the optimal service bundles to customer, in the event one or more optimal service bundles are not in the list.

3. The method of claim 1 further comprising:

receiving a direction from said customer to register said customer for one service bundle; and

enrolling said customer with said providers for one or more plans in said service bundle.

4. The method of claim 1 further comprising:

receiving a direction from said customer to register said customer for one service bundle;

automatically contacting a old provider which the customer already uses with the information of a cost of the relevant plan in the bundle; and

allowing the old provider to retain the customer by offering the identical relevant plan or a better relevant plan.

5. The method of claim 1 further comprising:

coordinating payments for said customer to all said providers; and

auditing said bills for one or more errors.

6. The method of claim 1 further comprising:

generating distributional models of one or more customer's usage information for one or more types of service; and

identifying one or more plans which are statistically unlikely to satisfy any customer.

7. The method of claim 6 further comprising:

eliminating said unlikely plans from consideration for the list.

8. The method of claim 1 further comprising:

eliminating from possible inclusion on a list one or more plans which have the same characteristics as another plan and is more expensive.

9. The method of claim 1 further comprising:

assigning in real time a weight to each plan based upon said preferences.

10. A method of comparing customer usages to service bundles comprising:

receiving a customer's usage information from one or more bills transmitted to the coordinator on an on-going basis upon receipt of said bills;

gathering one or more customer's preferences;

automatically statistically analyzing said usage information and said customer preferences for a list of one or more optimal service bundles, said statistical analyzing comprises one or more of the group consisting of parametric and nonparametric estimation;

generating a database, said database comprising said usage information from said bills;

eliminating one or more provider plans from a possible solution set based upon said usage information;

eliminating one or more provider plans from a possible solution set base upon prior iterations of said analysis; and

generating a list of one or more service bundles, said bundles optimize a total amount due for all said bills and satisfy customer preferences.

11. A method of calculating the potential costs incurred by a customer with a specified provider plan comprising:

generating a database, said database comprising one or more variables for one or more service plans offered by one or more providers;

compiling a customer's usage information from one or more bills transmitted to a coordinator;

designating a set of said plans as a potential solution set for said customer; and

determining a cost for each said plan in said set.

12. A method of ranking service plans comprising:

ranking service plans for said customer according to said customer's output requirements comprising one or more of the group consisting of lowest bill, best plan for each service, and listing all service plans.

13. An apparatus for minimizing total customer cost for bills, comprising:

a means for gathering usage information derived from a customer's bills;

a means for receiving one or more customer preferences, wherein said preferences comprise one or more of the group consisting of geographical limitations, utility provider limitations, and anticipated usage patterns;

a means for compiling a database of one or more service plans offered by one or more providers;

a means for generating, in response to said customer preferences, a list of one or more service bundles for said customer, wherein said bundle optimizes a total amount due for all said bills; and

a means for communicating said list to said customer for evaluation.

14. The apparatus of claim 13 further comprising:

a means for automatically gathering said usage information upon receipt of each bill;

a means for automatically evaluating said usage information with new preferences resulting from one or more permanent changes in a usage pattern;

a means for automatically generating a new list of one or more service bundles, said bundles optimize a total amount due for all said bills and satisfy customer preferences;

a means for automatically comparing the list and the new list;

a means for designating one or more optimal service bundles; and

a means for communicating the optimal service bundles to customer, in the event one or more optimal service bundles are not in the list.

15. The apparatus of claim 13 further comprising:

a means for receiving a direction from said customer to register said customer for one service bundle; and

a means for enrolling said customer with said providers for one or more plans in said service bundle.

16. The apparatus of claim 13 further comprising:

a means for receiving a direction from said customer to register said customer for one service bundle;

a means for automatically contacting a old provider which the customer already uses with the information of a cost of the relevant plan in the bundle; and

a means for allowing the old provider to retain the customer by offering one of the group consisting of an identical relevant plan and a better relevant plan.

17. The apparatus of claim 13 further comprising:

a means for coordinating payments for said customer to all said providers; and

a means for auditing said bills for one or more errors.

18. An apparatus of comparing customer usages to service bundles comprising:

a means for receiving a customer's usage information from one or more bills transmitted to the coordinator on an on-going basis upon receipt of said bills;

a means for gathering one or more customer's preferences;

a means for automatically statistically analyzing said usage information and said customer preferences for a list of one or more optimal service bundles, said statistical analyzing comprises one or more of the group consisting of parametric and nonparametric estimation;

a means for generating a database, said database comprising said usage information from said bills;

a means for eliminating one or more provider plans from a possible solution set based upon said usage information;

a means for eliminating one or more provider plans from a possible solution set base upon prior iterations of said analysis; and

a means for generating a list of one or more service bundles, said bundles optimize a total amount due for all said bills and satisfy customer preferences.

19. An apparatus of calculating the potential costs incurred by a customer with a specified provider plan comprising:

a means for generating a database, said database comprising one or more variables for one or more service plans offered by one or more providers;

a means for compiling a customer's usage information from one or more bills transmitted to a coordinator;

a means for designating a set of said plans as a potential solution set for said customer; and

a means for determining a cost for each said plan in said set.

20. An apparatus of ranking service plans comprising:

a means for ranking service plans for said customer according to said customer's output requirements comprising one or more of the group consisting of lowest bill, best plan for each service, and listing all service plans.

21. A method of parsing information from one or more bills from one or more providers for one or more plans comprising:

describing a bill's format with a graphical user interface, said description noting one or more of characteristics consisting of important information, position of the particular information, data types, and table details;

transferring the description to one of the formats consisting of XML, HTML and self-defined tagged languages;

automatically generating one or more functions in programming language from the modified description;

using the function to process one or more bills from one or more providers as context free grammar, and

extracting the information from said bills.

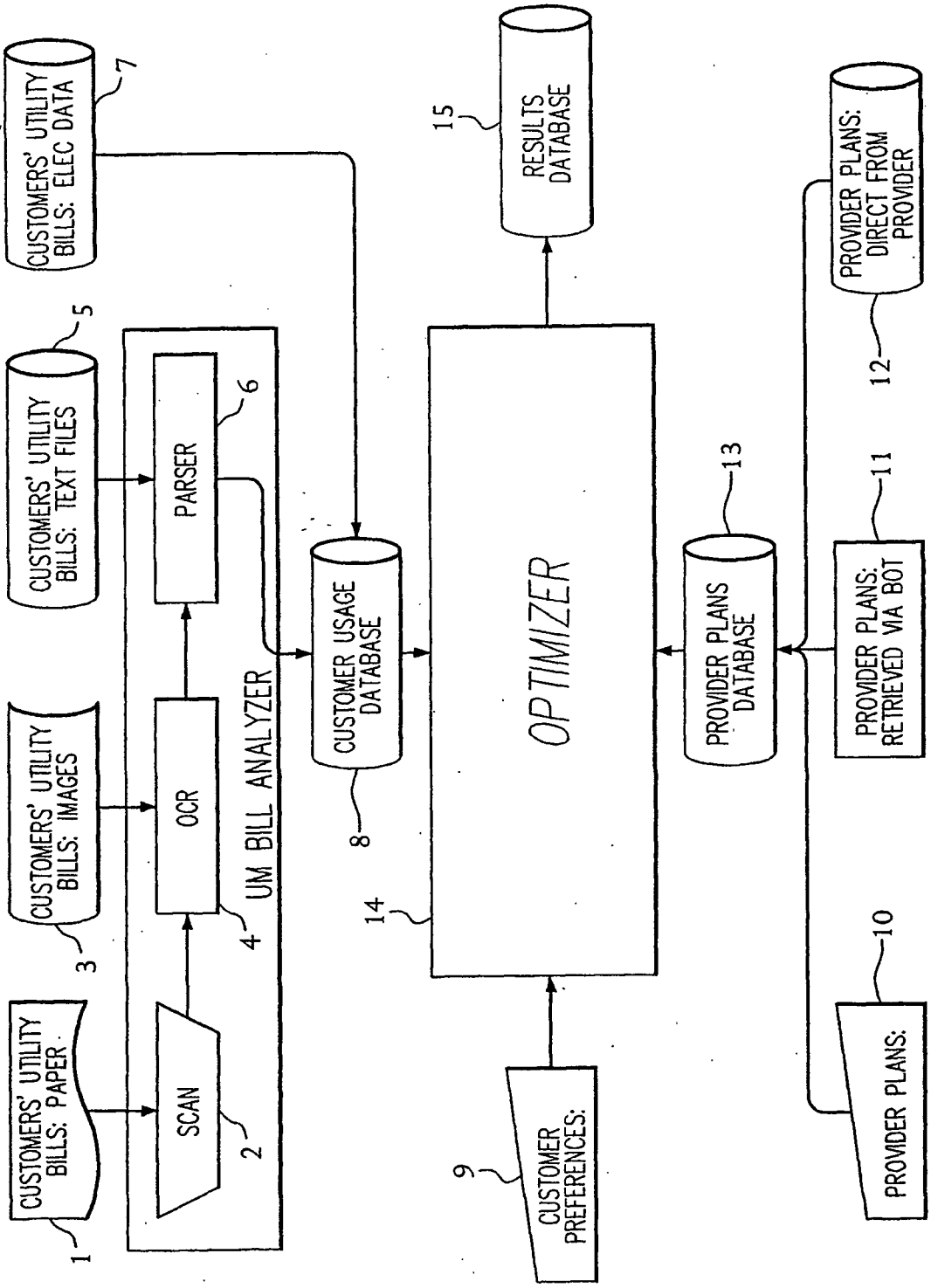
CUSTOMERS' UTILITY BILLS: PAPER
1
SCAN
2
CUSTOMERS' UTILITY BILLS: IMAGES
3
OCR
4
CUSTOMERS' UTILITY BILLS: TEXT FILES
5
PARSER
6
UM BILL ANALYZER
CUSTOMERS' UTILITY BILLS: ELEC DATA
7
CUSTOMER USAGE DATABASE
8
CUSTOMER PREFERENCES:
9
PROVIDER PLANS:
10
PROVIDER PLANS: RETRIEVED VIA BOT
11
PROVIDER PLANS: DIRECT FROM PROVIDER
12
PROVIDER PLANS DATABASE
13
OPTIMIZER
14
RESULTS DATABASE
15

FIG. 1

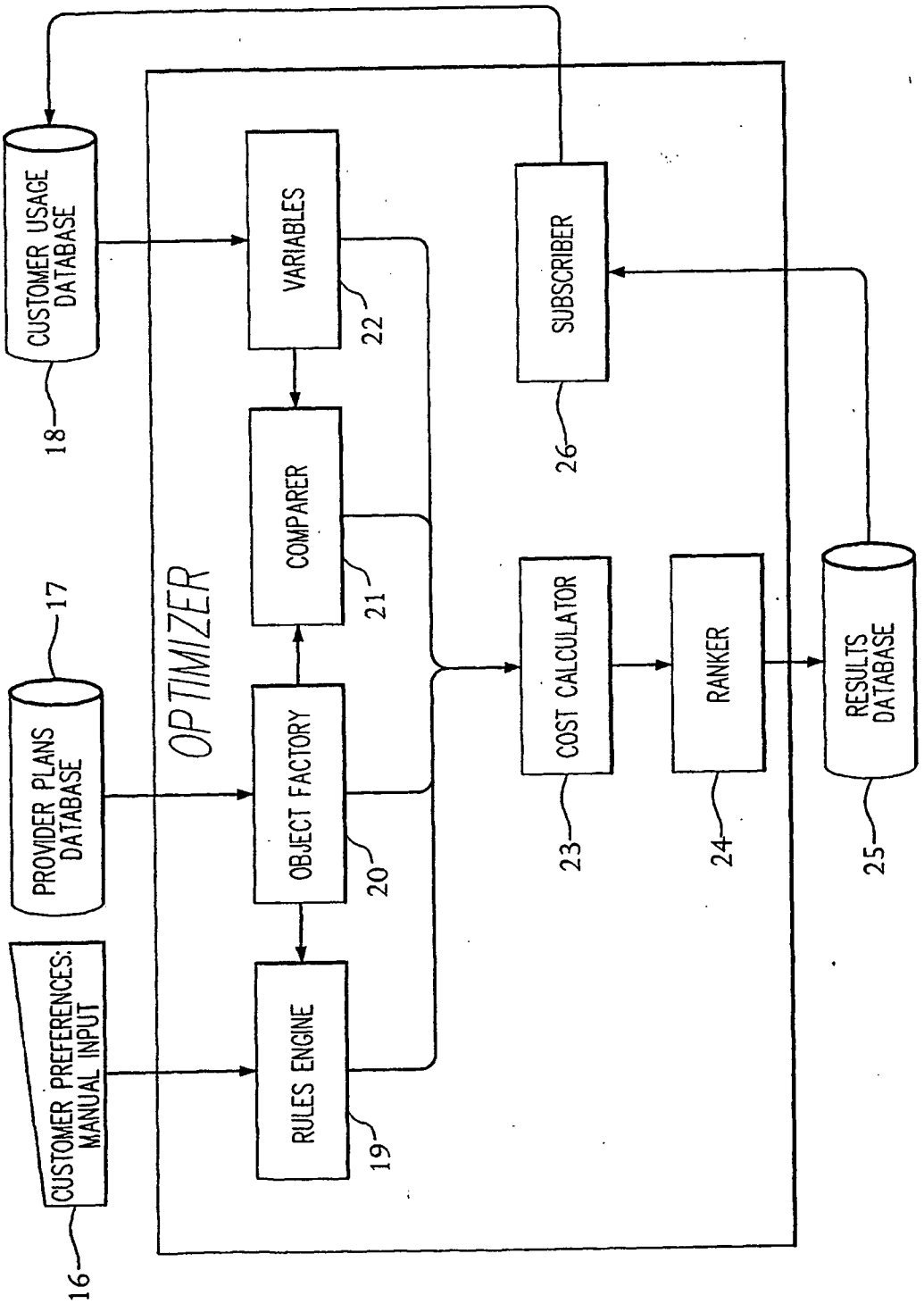
CUSTOMER USAGE DATABASE
18
VARIABLES
22
SUBSCRIBER
26
COMPARER
21
OPTIMIZER
17
PROVIDER PLANS DATABASE
OBJECT FACTORY
20
COST CALCULATOR
23
RANKER
24
RESULTS DATABASE
25
CUSTOMER PREFERENCES: MANUAL INPUT
16
RULES ENGINE
19

FIG. 2

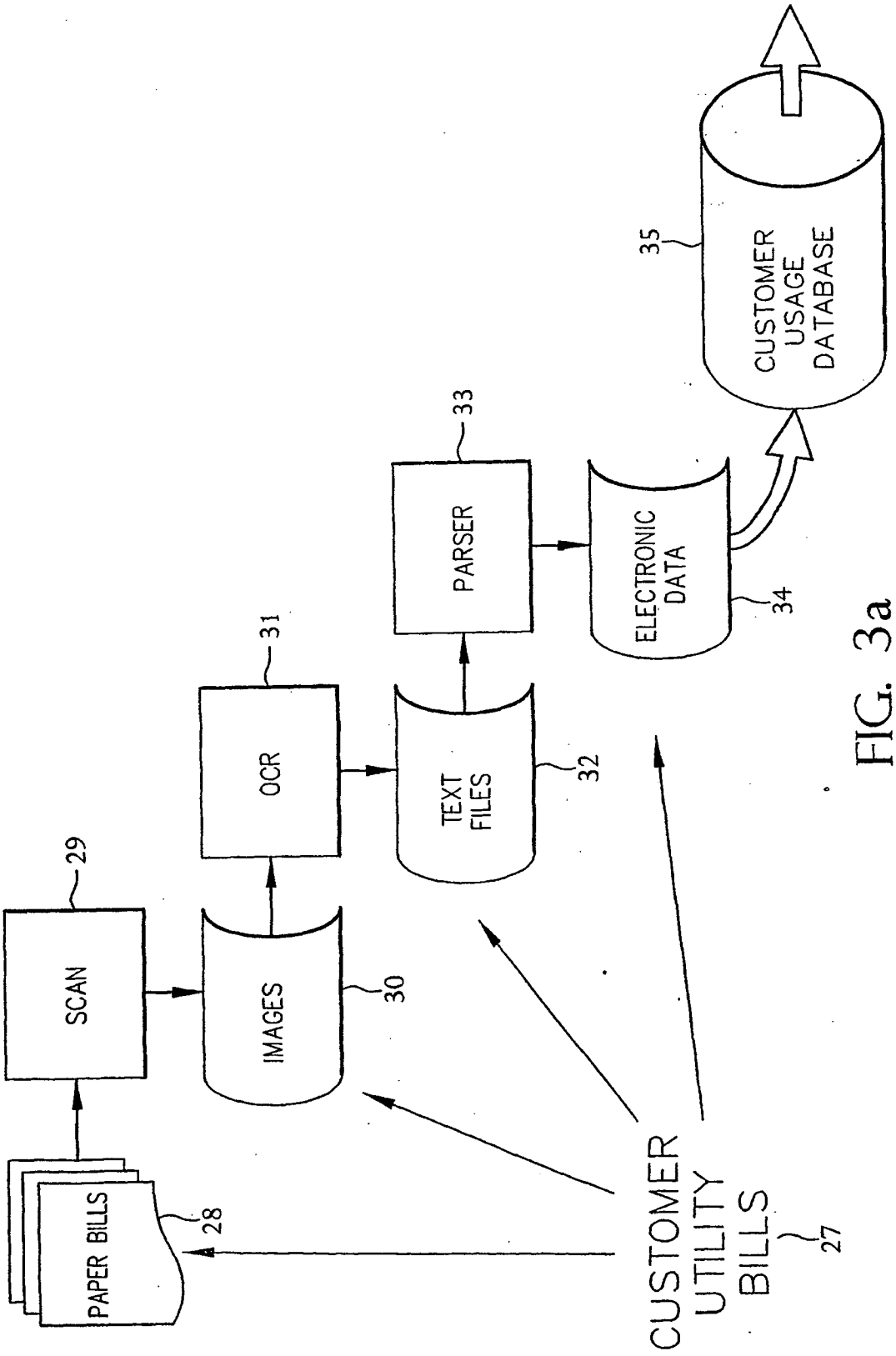
CUSTOMER UTILITY BILLS
27
PAPER BILLS
28
SCAN
29
IMAGES
30
OCR
31
TEXT FILES
32
PARSER
33
ELECTRONIC DATA
34
CUSTOMER USAGE DATABASE
35

FIG. 3a

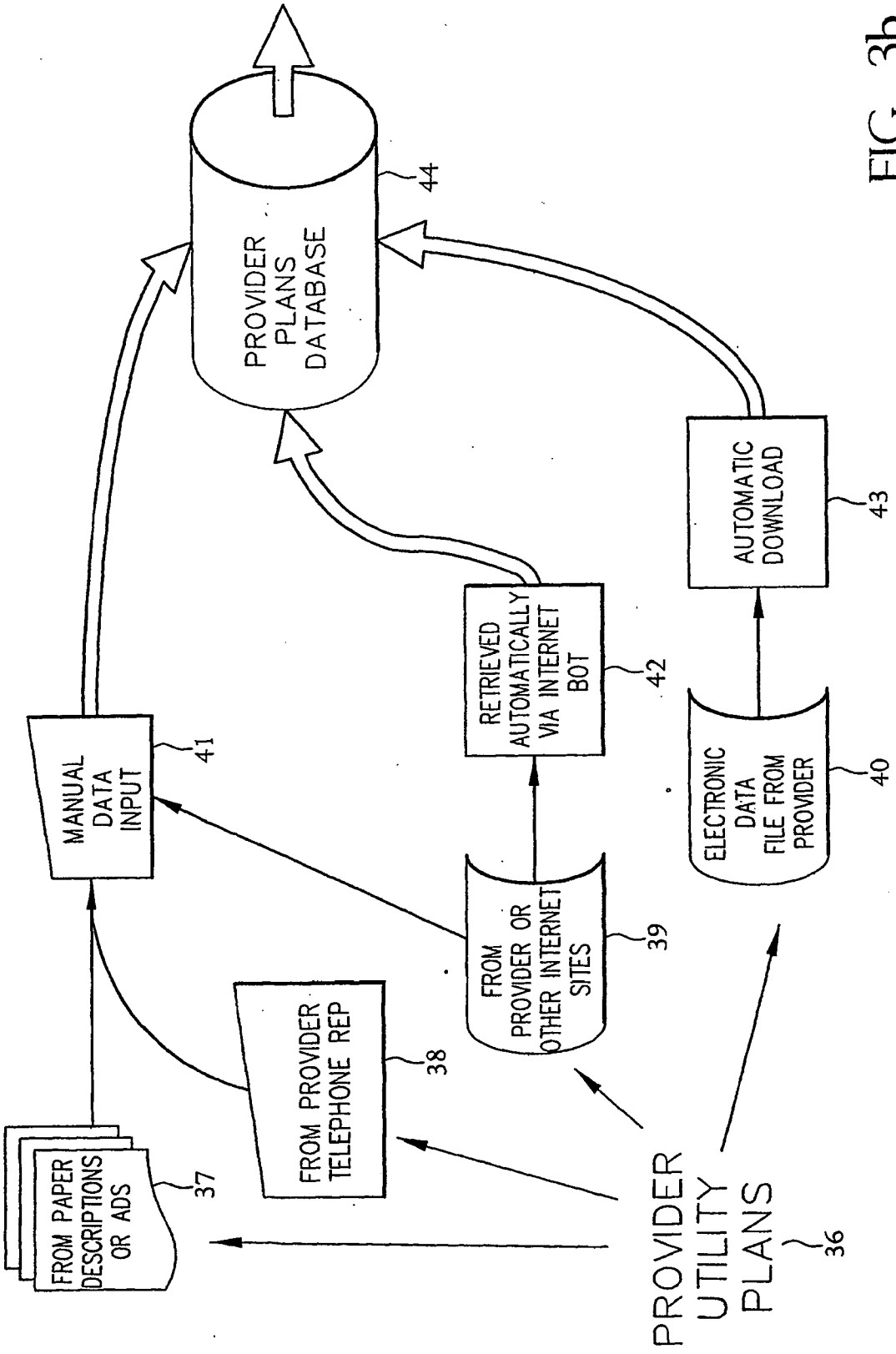
PROVIDER UTILITY PLANS
36
FROM PAPER DESCRIPTIONS OR ADS
37
FROM PROVIDER TELEPHONE REP
38
FROM PROVIDER OR OTHER INTERNET SITES
39
ELECTRONIC DATA FILE FROM PROVIDER
40
MANUAL DATA INPUT
41
RETRIEVED AUTOMATICALLY VIA INTERNET BOT
42
AUTOMATIC DOWNLOAD
43
PROVIDER PLANS DATABASE
44

FIG. 3b

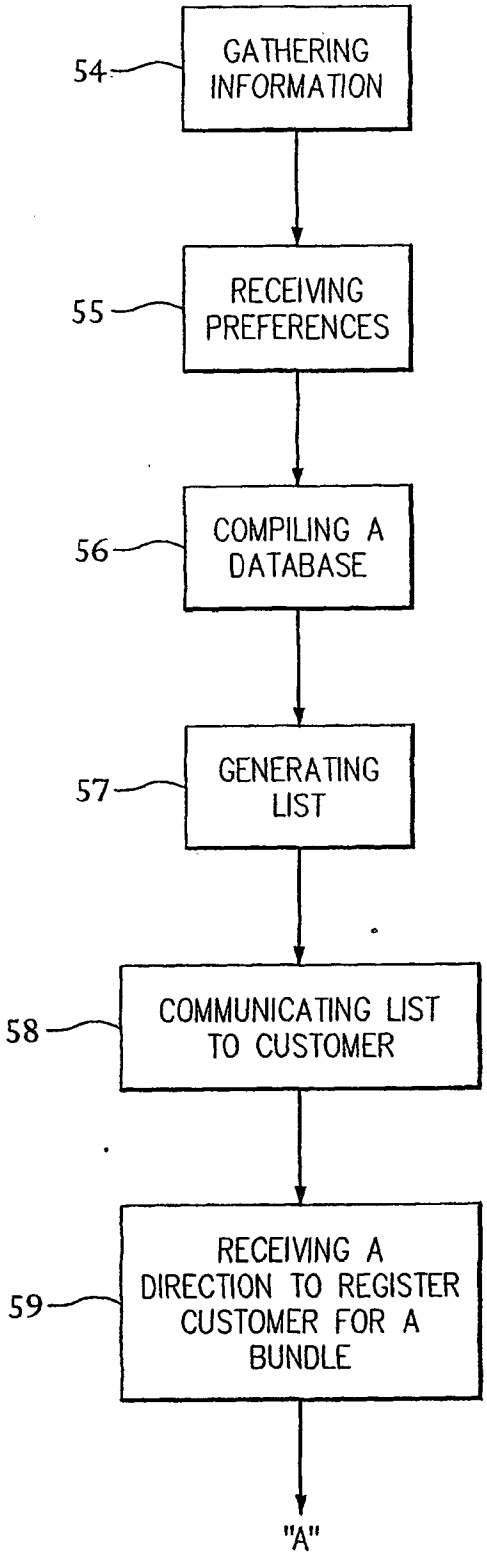
54
GATHERING INFORMATION
55
RECEIVING PREFERENCES
56
COMPILING A DATABASE
57
GENERATING LIST
58
COMMUNICATING LIST TO CUSTOMER
59
RECEIVING A DIRECTION TO REGISTER CUSTOMER FOR A BUNDLE
"A"

FIG. 4a

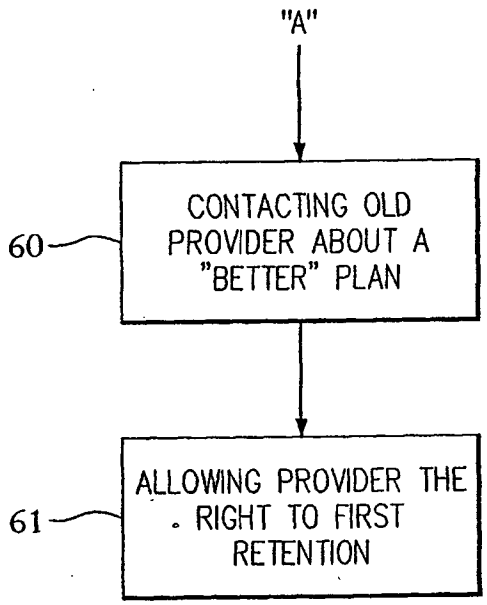
"A"
60
CONTACTING OLD PROVIDER ABOUT A "BETTER" PLAN
61
ALLOWING PROVIDER THE RIGHT TO FIRST RETENTION

FIG. 4b

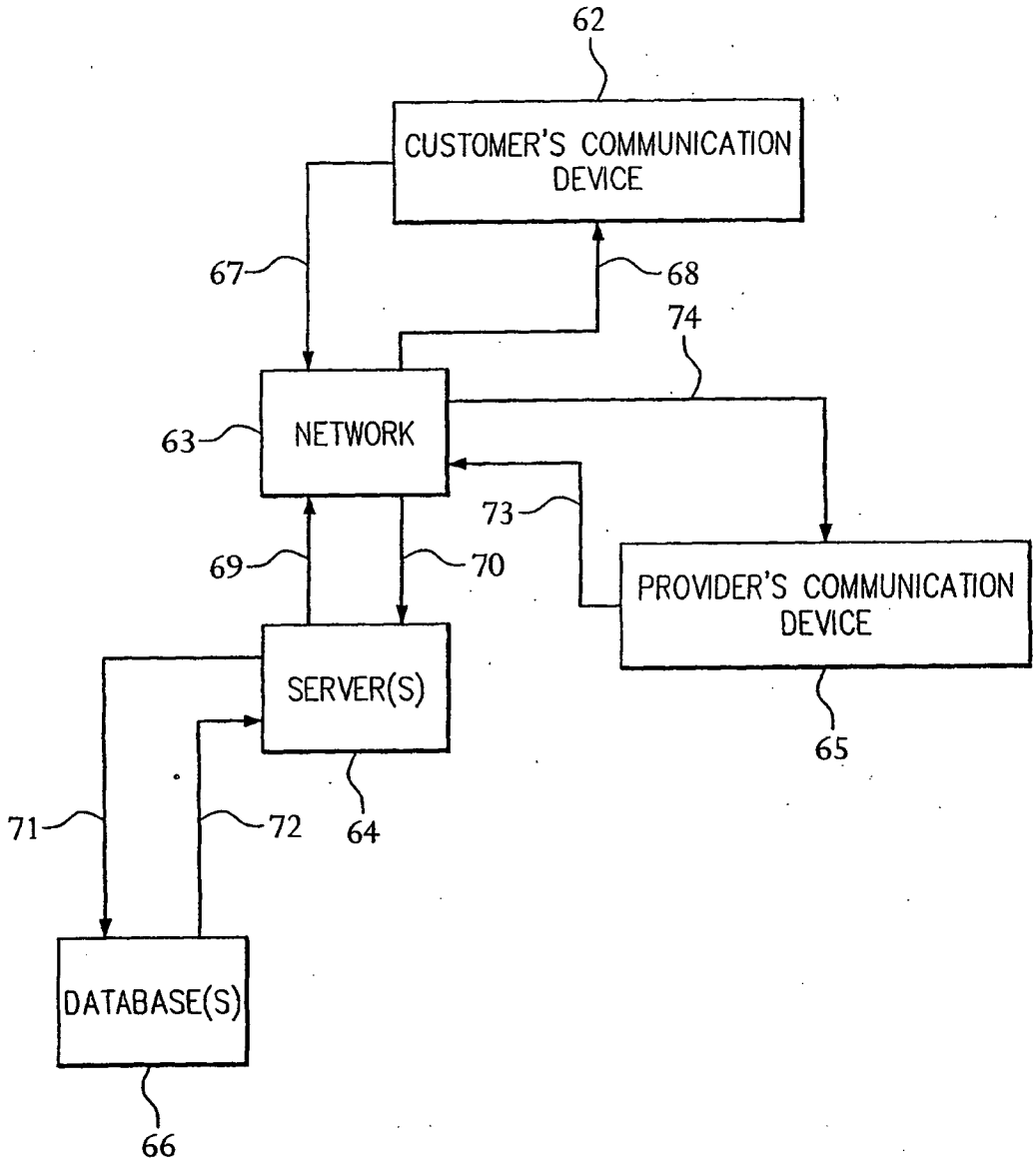
62
CUSTOMER'S COMMUNICATION DEVICE
67
68
74
63
NETWORK
73
69
70
PROVIDER'S COMMUNICATION DEVICE
SERVER(S)
65
71
72
64
DATABASE(S)
66

FIG. 5

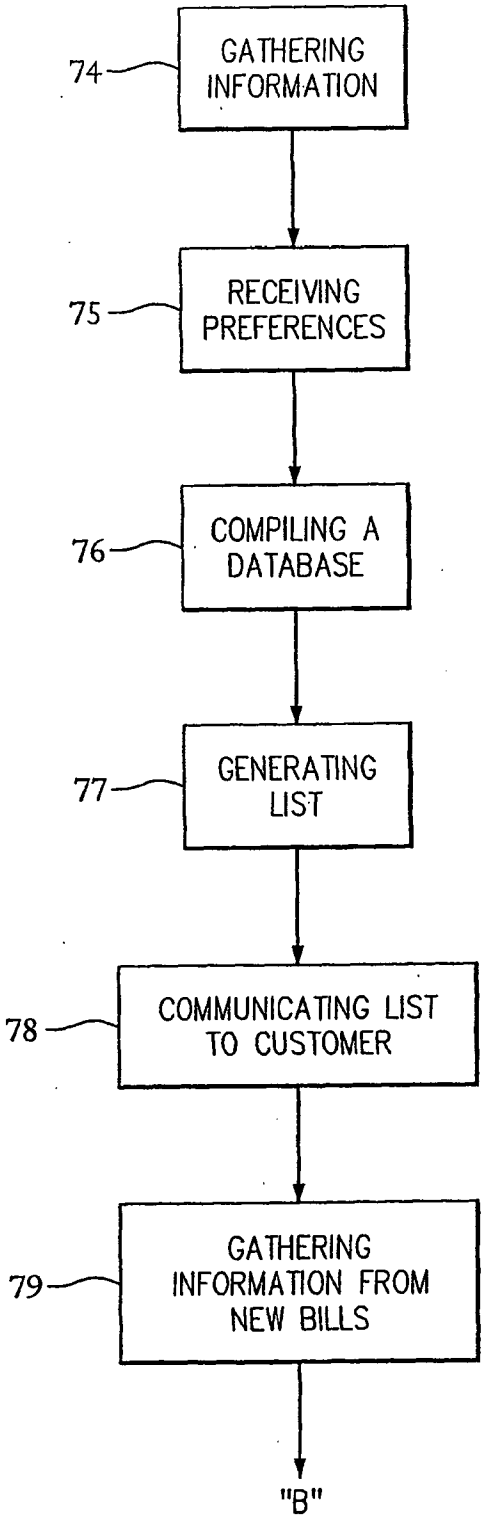
74
GATHERING INFORMATION
75
RECEIVING PREFERENCES
76
COMPILING A DATABASE
77
GENERATING LIST
78
COMMUNICATING LIST TO CUSTOMER
79
GATHERING INFORMATION FROM NEW BILLS
"B"

FIG. 6a

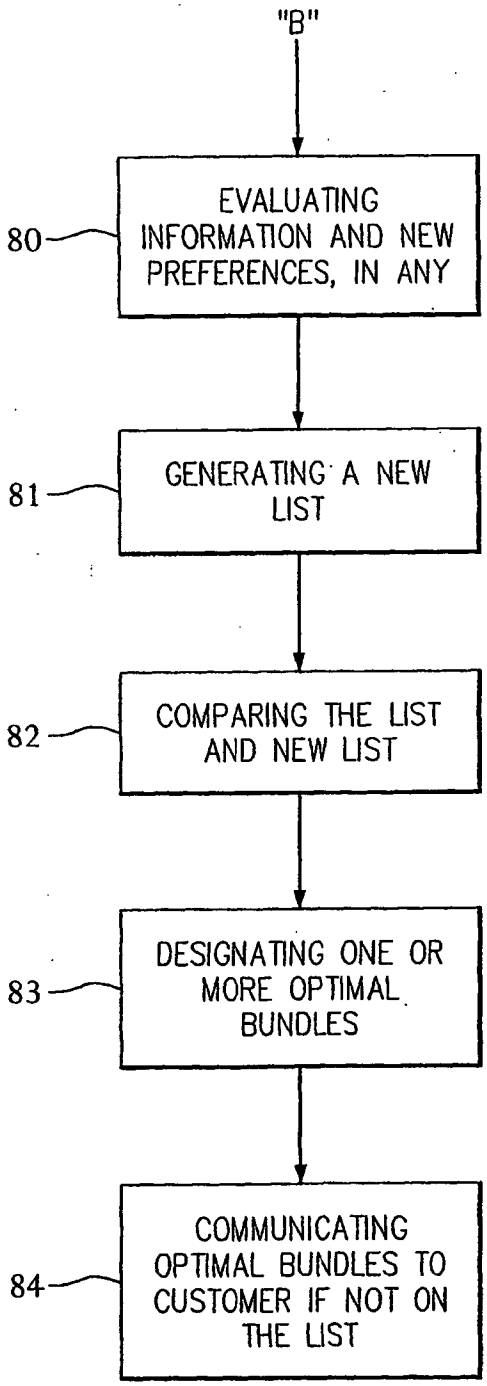
"B"
80
EVALUATING INFORMATION AND NEW PREFERENCES, IN ANY
81
GENERATING A NEW LIST
82
COMPARING THE LIST AND NEW LIST
83
DESIGNATING ONE OR MORE OPTIMAL BUNDLES
84
COMMUNICATING OPTIMAL BUNDLES TO CUSTOMER IF NOT ON THE LIST

FIG. 6b

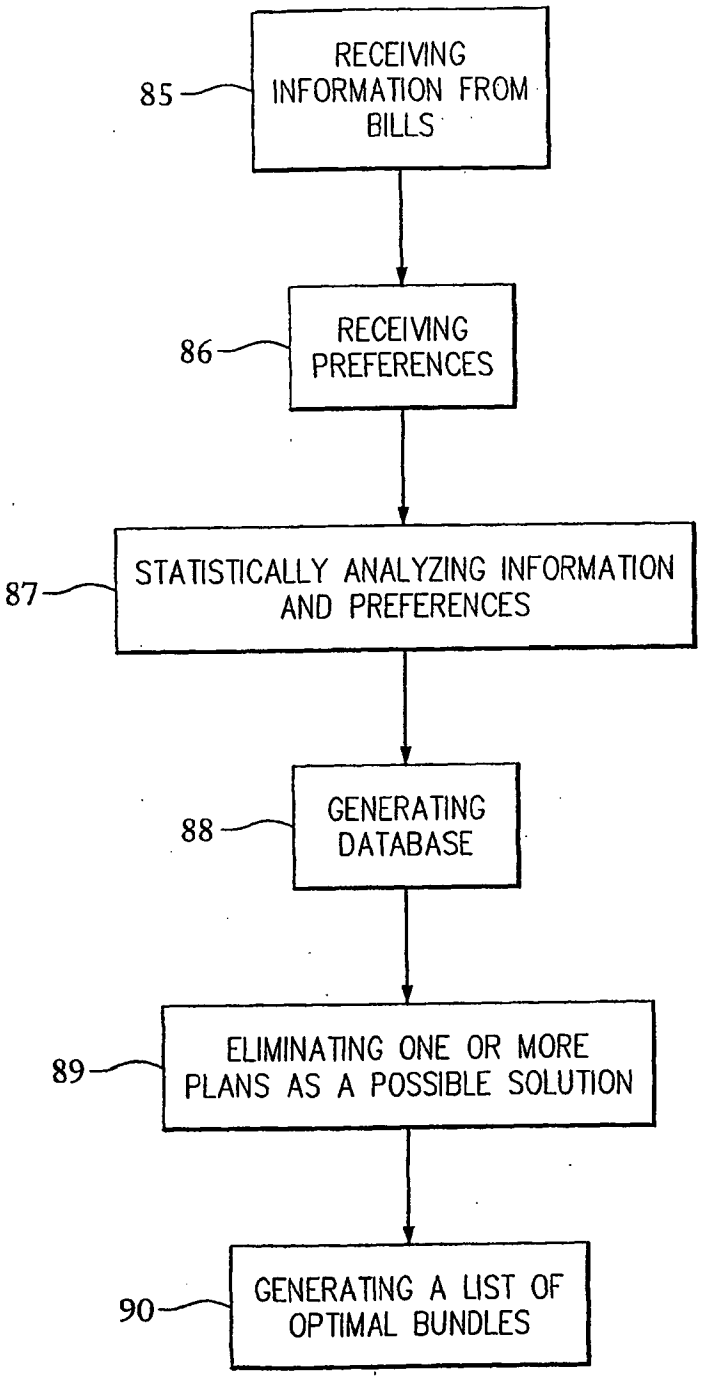
85
RECEIVING INFORMATION FROM BILLS
86
RECEIVING PREFERENCES
87
STATISTICALLY ANALYZING INFORMATION AND PREFERENCES
88
GENERATING DATABASE
89
ELIMINATING ONE OR MORE PLANS AS A POSSIBLE SOLUTION
90
GENERATING A LIST OF OPTIMAL BUNDLES

FIG. 7

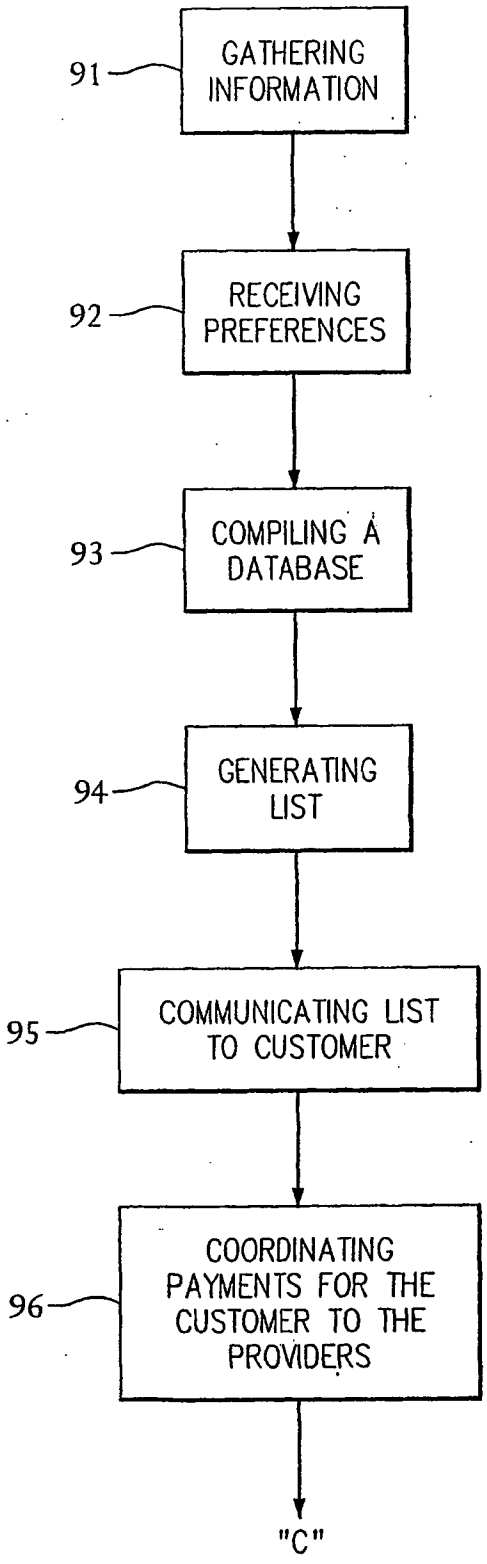
91
GATHERING INFORMATION
92
RECEIVING PREFERENCES
93
COMPILING A DATABASE
94
GENERATING LIST
95
COMMUNICATING LIST TO CUSTOMER
96
COORDINATING PAYMENTS FOR THE CUSTOMER TO THE PROVIDERS
"C"

FIG. 8a

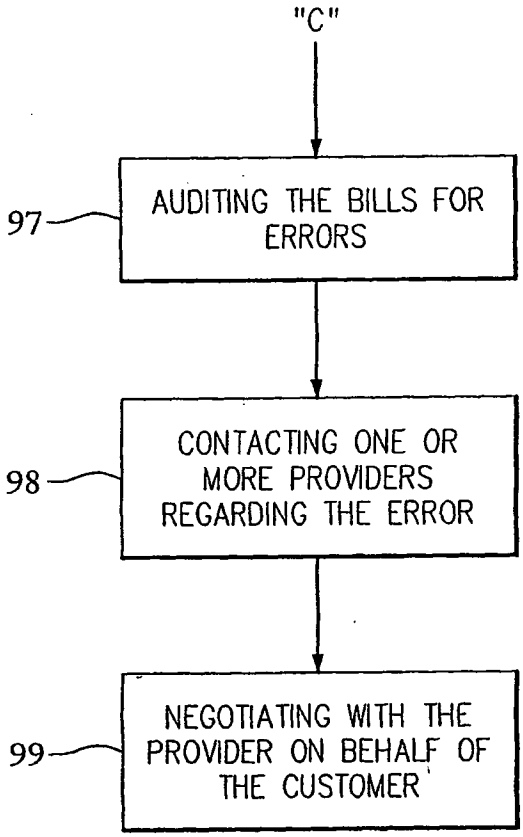
"C"
97
AUDITING THE BILLS FOR ERRORS
98
CONTACTING ONE OR MORE PROVIDERS REGARDING THE ERROR
99
NEGOTIATING WITH THE PROVIDER ON BEHALF OF THE CUSTOMER

FIG. 8b

Table	Name Table Column Name	
Address 100	Customer_Id	100a
	Address_Type	100b
	state_code	100c
	Address_Line 1	100d
	Address_Line 2	100e
	Address_Line 3	100f
	City	100g
	Zip_Code	100h
Agg_Usage 101	Subscription_Id	101a
	agg_type	101b
	Bill_Date	101c
	Country_Code	101d
	Value	101e
	Usage_Minutes	101f
	Usage_Dollars	101g
	no_of_calls	101h
Area_Codes 102	Area_Code	102a
	Jurisdiction_Id	102b
Bundles 103	Bundle_ID	103a
	Bundle_Effective_Start_Date	103b
	Bundle_Name	103c
	Bundle_Effective_End_date	103d
	Bundle_Flat_Fee	103e
	commit_flag	103f
Choice 104	Plan_Id	
	Provider_Id	
	Choice_Start_Date	
	Choice_End_Date	

FIG. 9a

	Bundle_ID	
	Type_Of_Service	
	choice_id	
Customer 105	Customer_ID	105a
	Middle_Name	105b
	Last_Name	105c
	SSN 105d	
	First_Name	105e
	email_address	105f
	alt_email_address	105g
	Title	105h
	Suffix	105i
	Customer_Since	105j
	Driv_License_Number	105k
	Driv_License_State	105l
	Date_Of_Birth	105m
	Acct_Password	105n
Customer_Phones 106	Customer_Id	106a
	Phone_Type	106b
	Area_Code	106c
	Contact_Hours	106d
	Phone_Number	106e
	Extension	106f
Feature_Master 108	Feature_ID	108a
	Type_Of_Service	108b
	Feature_Name	108c
Features_Customer_	Provider_ID	109a
Bundle 109		
	Type_Of_Service	109b
	Feature_End_Date	109c

FIG. 9b

	Subscription_Id	109d
	Plan_Id	109e
	Feature_ID	109f
Features-Plan 110	Feature_Start_Date	110a
	Type_of_Service	110b
	Feature_Value	110c
	Feature_End_Date	110d
	Feature_ID	110e
	Provider_Id	110f
	Plan_Id	110g
Jurisdiction 111	Jurisdiction_Id	111a
	Coverage_Name	111b
Levels 112	Rate_Id	112a
	Period_Id	112b
	Level_Id	112c
	Level_Value	112d
	Level_Rate	112e
Order_Response	Order_ID	
	Provider_Id	
	Order_Response_Id	
	Order_Reference_No	
	Start_Date	
	Provider_Timestamp	
	Response_Status_Code	
	email_sent	
	Order_Updated	
Order_Response_ Detail	Order_ID	
	Provider_Id	
	Order_Response_Id	
	Error_Type	

FIG. 9c

		Error_Code	
Orders	115	Order_ID	115a
		Customer_Id	115b
		Provider_Id	115c
		Order_Date	115d
		Credit_card_Type	115e
		Credit_Card_Number	115f
		Credit_Card_Authorization	115g
		Order_Amount	115h
		Credit_Card_Expiration	115i
		Order_Status	115j
		Order_Reference_No	115k
Periods		Period_ID	
		Name	
Periods_Cycles		Period_Id	
		Cycle_Id	
Plans	118	Plan_Id	118a
		Provider_Id	118b
		Plan_Type	118c
		Description	118d
		Bundled_Only	118e
		Plan_Start_Date	118f
		Plan_End_Date	118g
		Plan_Flat_fee	118h
		Plan_Logic	118i
		Rate_Id	118m
		Time_Schedule_Id	118n
		Name	118o
		Type_Of_Service	118p
		commit_flag	118q

FIG. 9d

Plans_Coverage	119	Jurisdiction_Id	119a
		Plan_Coverage_Start_Date	119b
		Plan_Coverage_End_Date	119c
		Provider_Id	119d
		Plan_Id	119e
Preferences	120	Customer_Id	120a
		Provider_Id	120b
		Type_Of_Service	120c
		Per_savings_int	120d
		Amt_Savings_Int	120e
Promotion	121	Promotion_Id	121a
		Bundle_ID	121b
		Promotion_name	121c
		Value	121d
		Start_Date	121e
		End_Date	121f
		Description	121g
Provider	122	Provider_Id	122a
		state_code	122b
		Provider_Name	122c
		Address_Line_1	122d
		Address_Line_2	122e
		Address_Line_3	122f
		City	122g
		Zip	122h
		Parent_Provider_Id	122i
		Web_Site_URL	122j
		Telephone	122k
		Referral_Code	122l
Rate_Schedule		Rate_Id	123a
Aggregate	123		

FIG. 9e

		Aggregate_Value	123b
		Aggregate_Rate	123c
Rate_Schedules	124	Rate_ID	124a
		Period_Id	
		Level_Id	
		Time_Schedule_Id	
Rates	125	Rate_Id	125a
		Effective_Start_Date	125b
		Effective_End_Date	125c
		Type_Of_Service	125d
		Fixed_Fee	125e
Rates_Repeating	126	Rate_Id	126a
		Repeating_rate	126b
		Free_Units	126c
Sequence_gen	127	Sequence_Value	127a
		Sequence_Column	127b
States	128	state_code	128a
		Name	128b
Subscriptions	129	Subs_Start_Date	129a
		Plan_Id	129b
		Subs_End_date	129c
		Term	129d
		Account_Number	129e
		Subscription_Id	129f
		Provider_Id	129g
		Order_ID	129h
		Customer_Id	129i
Taxes_Tariffs	130	Jurisdiction_Id	130a
		Tax_Tariff_Id	130b
Types_Of_Service	134	Type_Of_Service	134a

FIG. 9f

		Description	134b
Types_Of_Service		Type_Of_Service	135a
Provider	135		
		Provider_Id	135b
Usage_Detail	136	Year	136b
		Week No	136c
		no_of_units	136d
		Usage_id	136e
		Usage_Detail_Id	136f
		Subscription_Id	136g
Usage_Master	137	Dollar_Amount	
		Repeating_Units	
		Method_Reported	
		Type_Of_Service	
		Customer_id	
		Subscription_Id	
		End_Date	
		Usage_Id	
		Start_Date	
Usage_Running_Avg		Repeating_Units	
	138		
		To_Date	
		Type_Of_Service	
		Customer_Id	
		Subscription_Id	
		From_Date	
		Usage_Avg_Id	
Usage_Running_		Running Avg Det Id	
Avg_Detail	139		
		Week_Time_Buck_No	
		No_Of_Units	
		Usage_Avg_Id	
		Subscription_Id	

FIG. 9g

Zip_Codes	140	Zip_Code	140a
Zones	141	Zone_Type	141a
		Value	141b
		Jurisdiction	141c

FIG. 9h

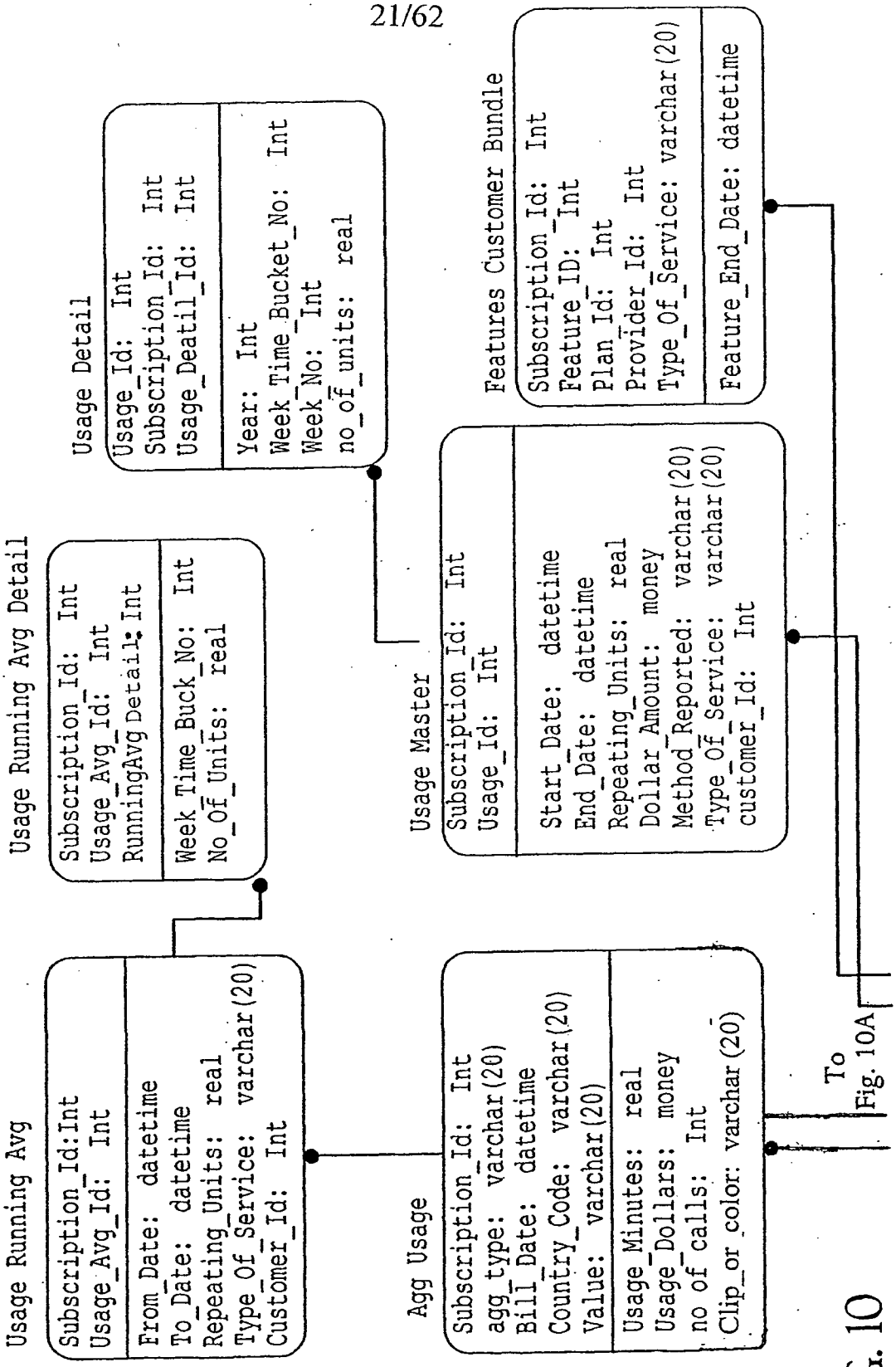
Usage Running Avg
Subscription_Id:Int
Usage_Avg_Id: Int
From_Date: datetime
To_Date: datetime
Repeating_Units: real
Type_Of_Service: varchar(20)
Customer_Id: Int
Usage Running Avg Detail
Subscription_Id: Int
Usage_Avg_Id: Int
RunningAvg Detail: Int
Week Time Buck No: Int
No_Of_Units: real
Usage Detail
Usage_Id: Int
Subscription_Id: Int
Usage_Deatil_Id: Int
Year: Int
Week_Time_Bucket_No: Int
Week_No: Int
no_of_units: real
Usage Master
Subscription_Id: Int
Usage_Id: Int
Start_Date: datetime
End_Date: datetime
Repeating_Units: real
Dollar_Amount: money
Method_Reported: varchar(20)
Type_Of_Service: varchar(20)
customer_Id: Int
Features Customer Bundle
Subscription_Id: Int
Feature_ID: Int
Plan_Id: Int
Provider_Id: Int
Type_Of_Service: varchar(20)
Feature_End_Date: datetime
Agg Usage
Subscription_Id: Int
agg_type: varchar(20)
Bill_Date: datetime
Country_Code: varchar(20)
Value: varchar(20)
Usage_Minutes: real
Usage_Dollars: money
no of calls: Int
Clip_or_color: varchar(20)
To
Fig. 10A

FIG. 10

SUBSTITUTE SHEET (RULE 26)

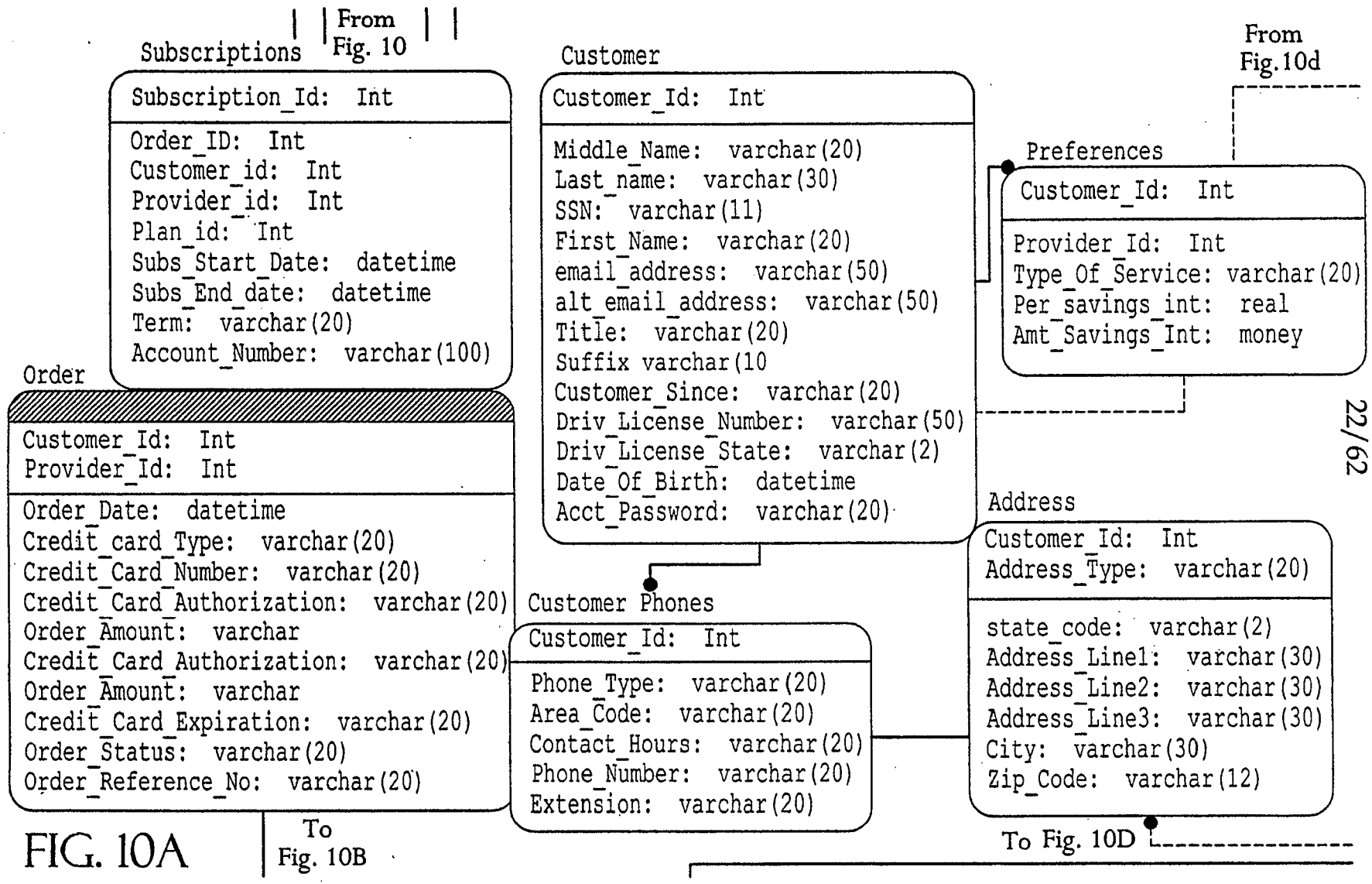

FIG. 10A

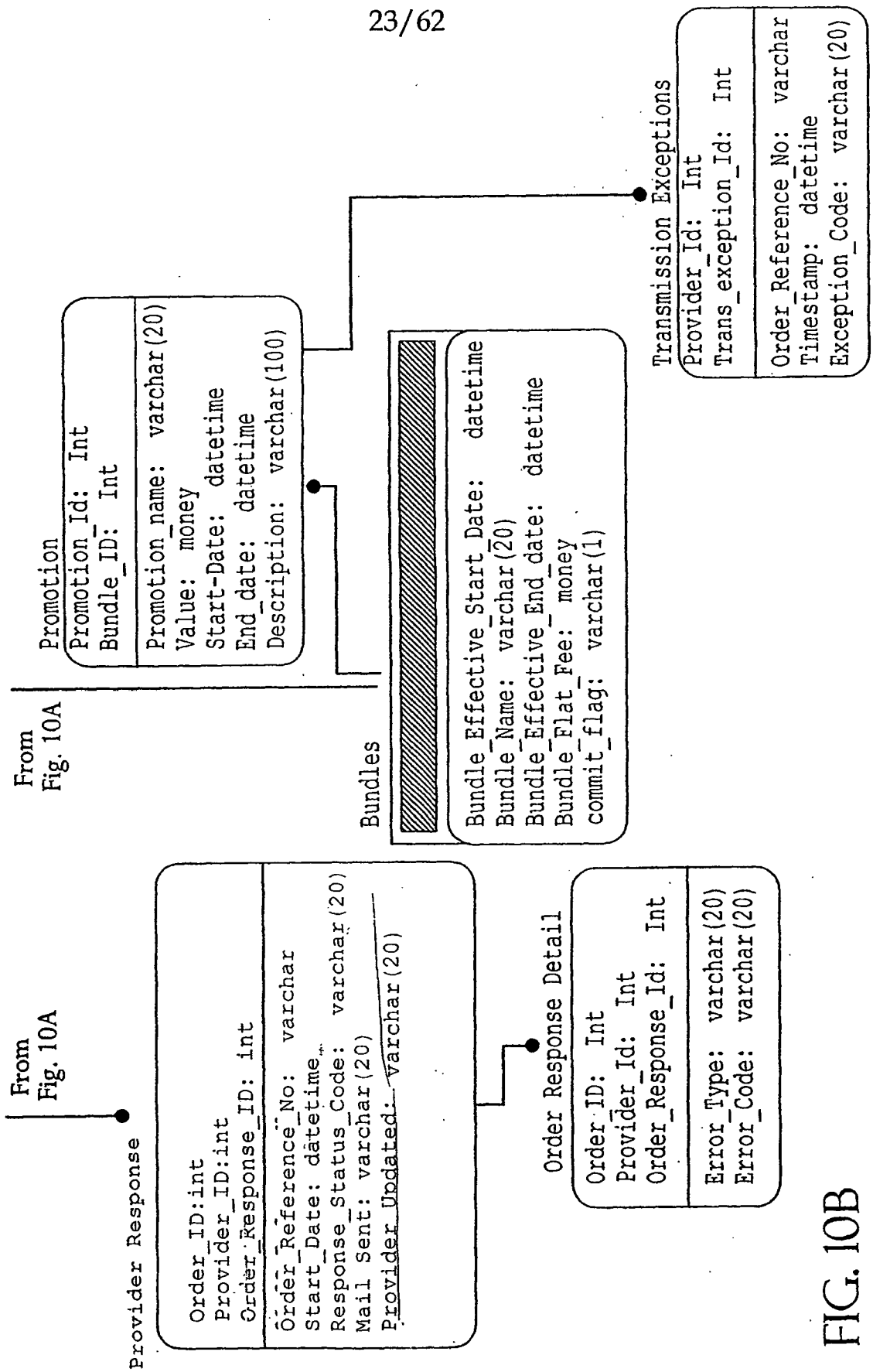
From Fig. 10A
Promotion
Promotion_Id: Int
Bundle_ID: Int
Promotion_name: varchar(20)
Value: money
Start-Date: datetime
End_date: datetime
Description: varchar(100)
Transmission Exceptions
Provider_Id: Int
Trans_exception_Id: Int
Order_Reference_No: varchar
Timestamp: datetime
Exception_Code: varchar(20)
Bundles
Bundle_Effective_Start_Date: datetime
Bundle_Name: varchar(20)
Bundle_Effective_End_date: datetime
Bundle_Flat_Fee: money
commit_flag: varchar(1)
From Fig. 10A
Provider Response
Order_ID:int
Provider_ID:int
Order_Response_ID: int
Order_Reference_No: varchar
Start_Date: datetime
Response_Status_Code: varchar(20)
Mail Sent: varchar(20)
Provider Updated: varchar(20)
Order Response Detail
Order_ID: Int
Provider_Id: Int
Order_Response_Id: Int
Error_Type: varchar(20)
Error_Code: varchar(20)

FIG. 10B

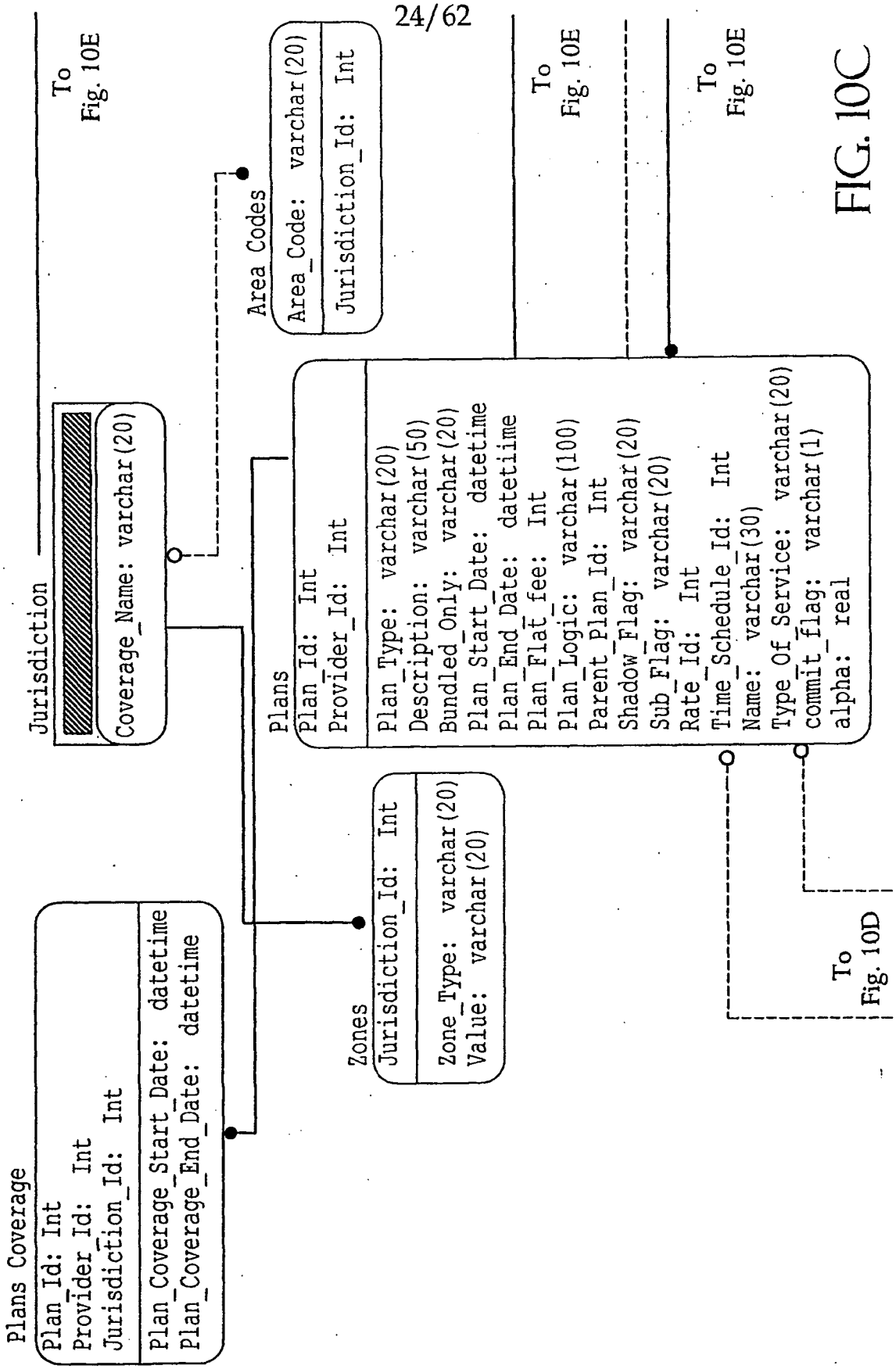
Jurisdiction
Coverage_Name: varchar(20)
To Fig. 10E
Area Codes
Area_Code: varchar(20)
Jurisdiction_Id: Int
Plans
Plan_Id: Int
Provider_Id: Int
Plan_Type: varchar(20)
Description: varchar(50)
Bundled_Only: varchar(20)
Plan_Start_Date: datetime
Plan_End_Date: datetiime
Plan_Flat_fee: Int
Plan_Logic: varchar(100)
Parent_Plan_Id: Int
Shadow_Flag: varchar(20)
Sub_Flag: varchar(20)
Rate_Id: Int
Time_Schedule_Id: Int
Name: varchar(30)
Type_Of_Service: varchar(20)
commit_flag: varchar(1)
alpha: real
To Fig. 10E
To Fig. 10E
Zones
Jurisdiction_Id: Int
Zone_Type: varchar(20)
Value: varchar(20)
Plans Coverage
Plan_Id: Int
Provider_Id: Int
Jurisdiction_Id: Int
Plan_Coverage_Start_Date: datetime
Plan_Coverage_End_Date: datetime
To Fig. 10D

FIG. 10C

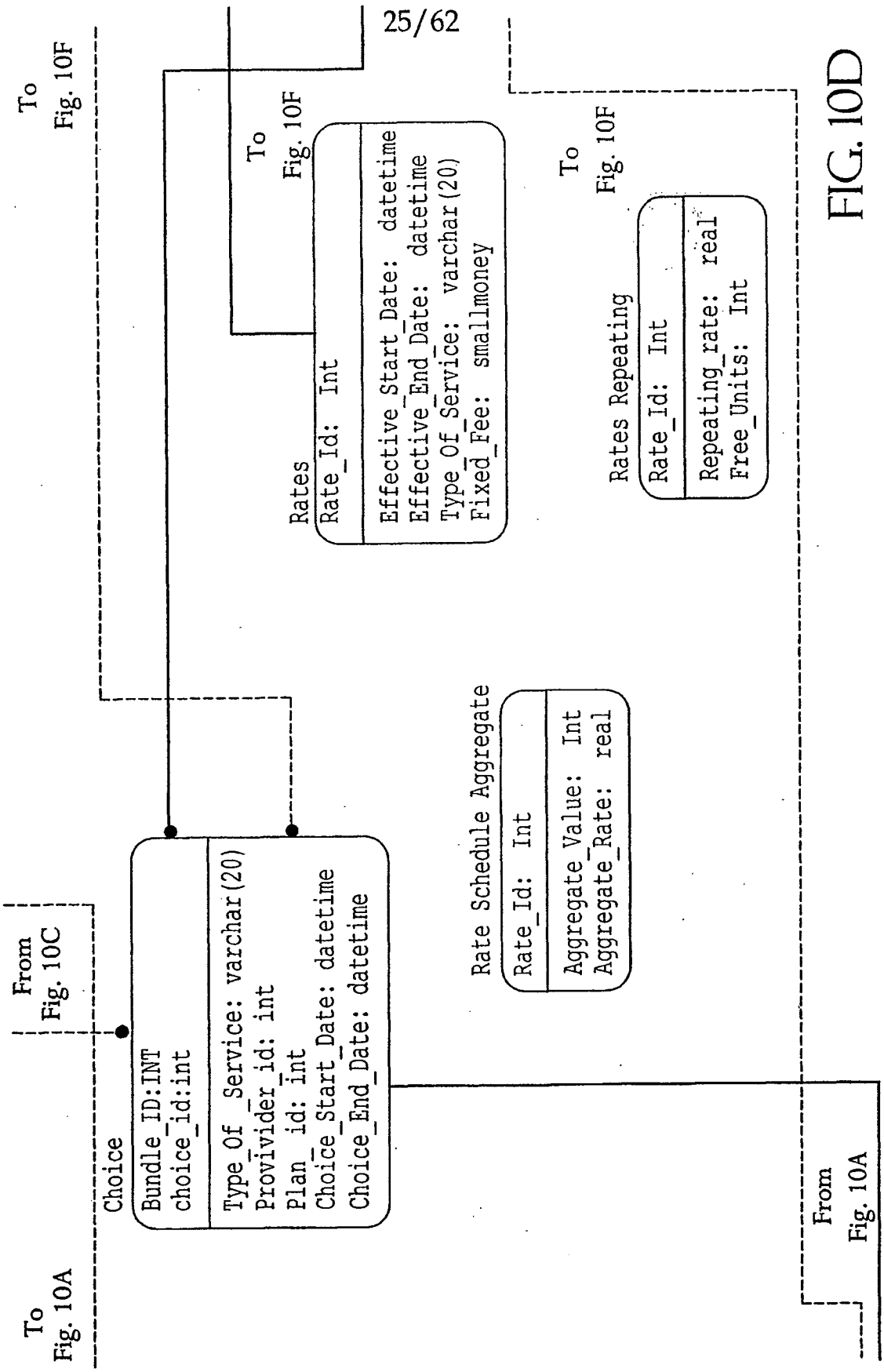
To Fig. 10A
From Fig. 10C
Choice
Bundle_ID:INT
choice_id:int
Type_Of_Service: varchar(20)
Provivider_id: int
Plan_id: int
Choice_Start_Date: datetime
Choice_End_Date: datetime
To Fig. 10F
Rates
Rate_Id: Int
Effective_Start_Date: datetime
Effective_End_Date: datetime
Type_Of_Service: varchar(20)
Fixed_Fee: smallmoney
Rate Schedule Aggregate
Rate_Id: Int
Aggregate_Value: Int
Aggregate_Rate: real
To Fig. 10F
Rates Repeating
Rate_Id: Int
Repeating_rate: real
Free_Units: Int
From Fig. 10A

FIG. 10D

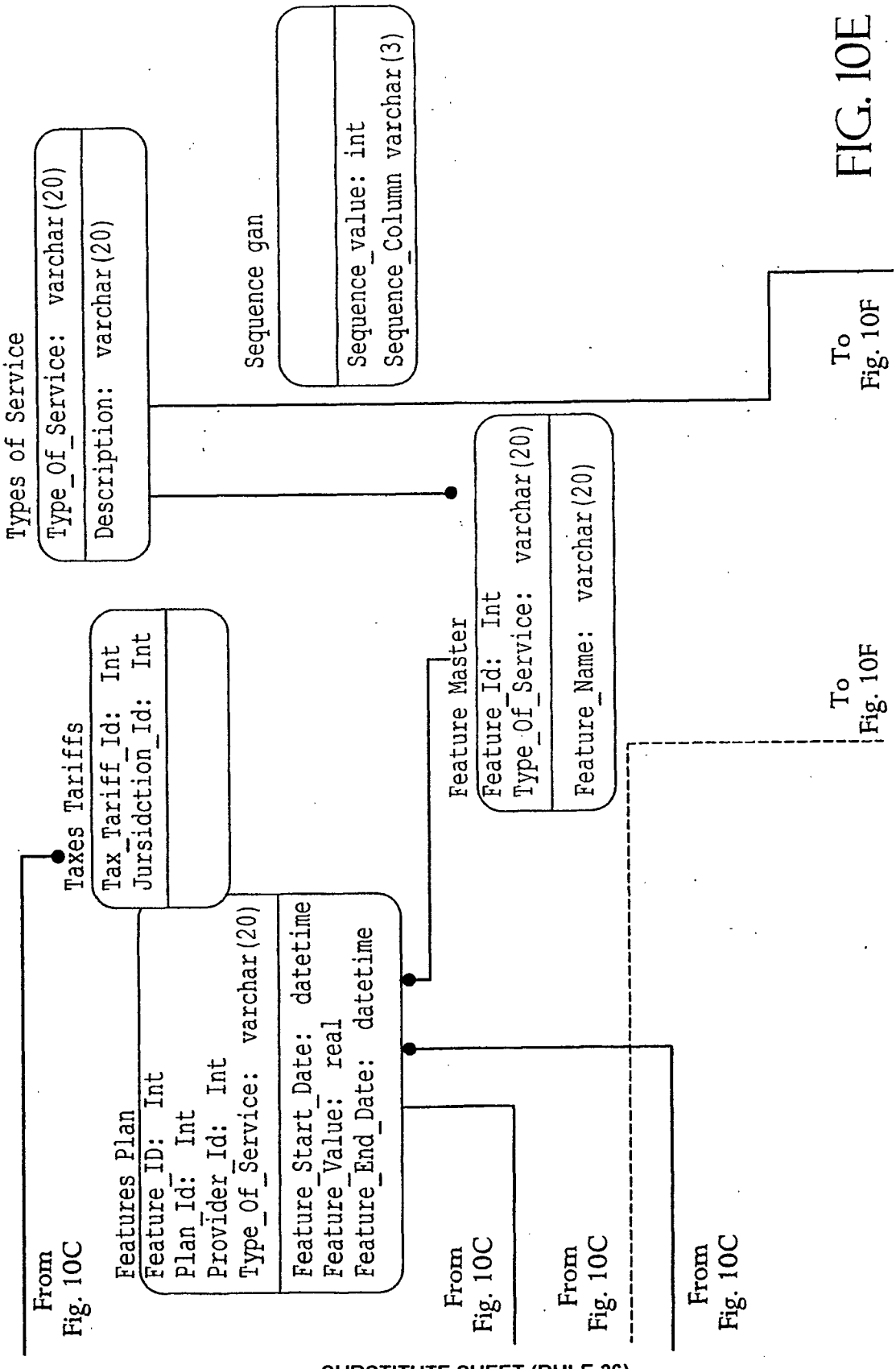
From Fig. 10C
Taxes Tariffs
Tax_Tariff_Id: Int
Jurisdction_Id: Int
Features Plan
Feature_ID: Int
Plan_Id: Int
Provider_Id: Int
Type_Of_Service: varchar(20)
Feature_Start_Date: datetime
Feature_Value: real
Feature_End_Date: datetime
From Fig. 10C
From Fig. 10C
From Fig. 10C
Feature Master
Feature_Id: Int
Type_Of_Service: varchar(20)
Feature_Name: varchar(20)
To Fig. 10F
To Fig. 10F
Types of Service
Type_Of_Service: varchar(20)
Description: varchar(20)
Sequence gan
Sequence_value: int
Sequence_Column varchar(3)

FIG. 10E

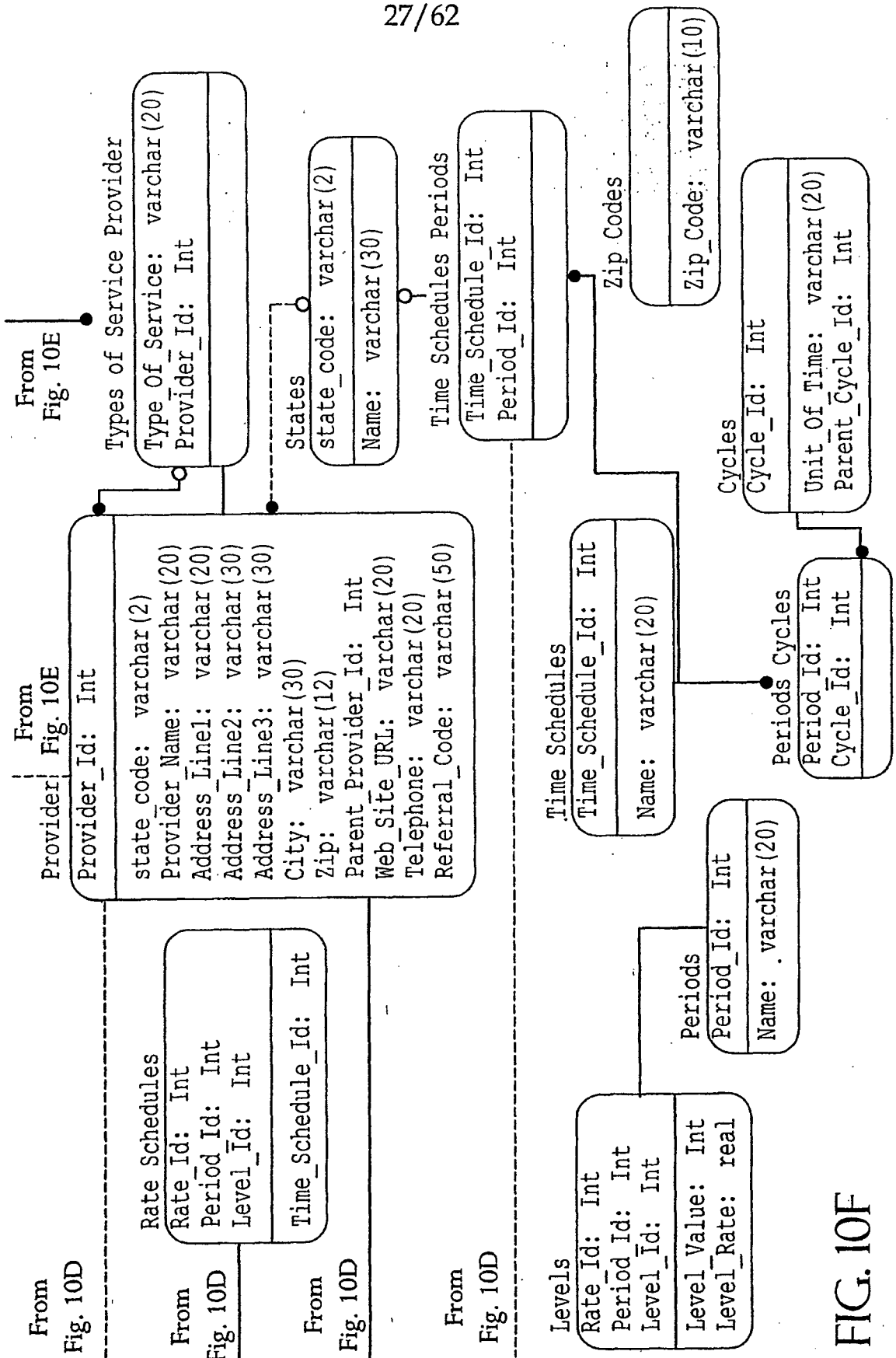
From Fig. 10E
Types of Service Provider
Type_Of_Service: varchar(20)
Provider_Id: Int
States
state_code: varchar(2)
Name: varchar(30)
Time Schedules Periods
Time_Schedule_Id: Int
Period_Id: Int
Zip Codes
Zip_Code: varchar(10)
Cycles
Cycle_Id: Int
Unit_Of_Time: varchar(20)
Parent_Cycle_Id: Int
From Provider Fig. 10E
Provider_Id: Int
state_code: varchar(2)
Provider_Name: varchar(20)
Address_Line1: varchar(20)
Address_Line2: varchar(30)
Address_Line3: varchar(30)
City: varchar(30)
Zip: varchar(12)
Parent_Provider_Id: Int
Web_Site_URL: varchar(20)
Telephone: varchar(20)
Referral_Code: varchar(50)
Time Schedules
Time_Schedule_Id: Int
Name: varchar(20)
Periods Cycles
Period_Id: Int
Cycle_Id: Int
From Fig. 10D
Rate Schedules
Rate_Id: Int
Period_Id: Int
Level_Id: Int
Time_Schedule_Id: Int
From Fig. 10D
From Fig. 10D
From Fig. 10D
Periods
Period_Id: Int
Name: varchar(20)
Levels
Rate_Id: Int
Period_Id: Int
Level_Id: Int
Level_Value: Int
Level_Rate: real

FIG. 10F

PARSER OUTPUT

TAG NAME	EXPLANATION
MNAME=	Middle Name of customer
LNAME=	Last Name of customer
FNAME=	First Name of customer
EMAIL=	Email Id of customer
ALTEMAIL=	Alternate Email Id of customer
TITLE=	Title of customer (like Ms)
SUFFIX=	Suffix (life Jr)
ACODE=	Area Code of customer
PHONE=	Phone number of customer
EXT=	Extension of customer
STCODE=	State Code of customer (For e.g. PA for Pennsylvania)
ADDR1=	First part of customer's address
ADDR2=	Second part of customer's address
CITY=	City of customer
ZIPCODE=	Zip Code of customer
PROVIDER=	Provider of the plan customer is subscribed to
PLANNAME=	Type of Service of the plan Customer is subscribed to. · For Wireless bill, value should be 'WS' · For Long Distance bill, TOS= Value should be 'LD' Name of the plan customer is subscribed to
ACCOUNT=	Customer's account number
SDATE=	Start Date of the bill
EDATE=	End Date of the bill
REPUNITS=	Repeating units
AMOUNT=	Total bill amount
DTLSDT1=	Start date of individual bill detail
DTLEDT1=	End date of individual bill detail
DTLNUM1=	Number called from individual bill detail
DTLSTCD1=	State code of number called from Individual bill detail (for e.g. PA for Pennsylvania or NJ for New Jersey)
DTLAMNT1=	Amount of individual bill detail

FIG. 11a

DTLUNIT1=	No. of minutes from individual bill detail
DTLCCD1=	Country code of number called from individual bill detail (For e.g. 91 for India)
DTLROAM1=	This field specifies whether this call is of type Wireless-Roaming. Set to 'Y' if Wireless-Roaming, else blank
DTLLD1=	This field specifies whether this call is of type Wireless-Long Distance. Set to 'Y' if Wireless-Long Distance, else blank
DTLINOUT1=	This field specifies whether this call is an inbound or outbound Wireless call. The values should be 'in' or 'out'

FIG. 11b

EXAMPLE OF PARSER OUTPUT

```
MNAME=|LNAME=SMITH|FNAME=PHILLIP|EMAIL=r@ut.com|ALTMAIL=r@ht.c
om|TITLE=Ms|SUFFIX=I|ACODE=215|PHONE=2155551212|EXT=1234|STCODE=P
A|ADDR1=1 MAIN
STREET|ADDR2=|CITY=Philadelphia|ZIPCODE=19103|PROVIDER=|TOS=LD
|PLANNAME=One Net Savings(sm)|ACCOUNT=Ph32UXXX|SDATE=08/01/1999
00:00:00|EDATE=|REPUNITS=|AMOUNT=$24.18|DTLSDT1=8/11/1999
21:57:00|DTLEDT1=|DTLNUM1=518 371-
0707|DTLSTCD1=NY|DTLAMNT1=0.18|DTLUNIT1=2|DTLCCD1=|DTLROAM1=|D
TLLD1=|DTLINOUT1=|DTLSDT2=8/12/199 09:08:00|DTLEDT2=|DTLNUM2=216
266-
8206|DTLSTCD2=OH|DTLAMNT2=0.45|DTLUNIT2=5|DTLCCD2=|DTLROAM2=|D
TLLD2=|DTLINOUT2=|DTLSDT3=8/12/1999 13:22:00|DTLEDT3=|DTLNUM3=518
371-
0707|DTLSTCD3=NY|DTLAMNT3=2.07|DTLUNIT3=23|DTLCCD3=|DTLROAM3=|
DTLLD3=|DTLINOUT3=
```

FIG. 12

SNAPSHOT OF BILL

Date	Time	Place	Number	Rate	Min	Amount
Aug 11	9:57p	Schenctady, NY	518 371-0707	24Hr	2	.18
Aug 11	9:08a	Cleveland, OH	216 266-8206	24Hr	5	0.45
Aug 12	1:22p	Schenctady, NY	518 371-0707	24Hr	23	2.07
Aug 12	2:50p	Richmond, VA	804 343-5041	24Hr	8	.72
Aug 12	5:51p	Orange, NJ	973 266-9618	24Hr	3	.27
Aug 12	6:03p	Orange, NJ	973 266-9618	24Hr	1	.09

PROCESSOR

Date	Time	Bucket number	Units
Aug 11	9:57p	376	2
Aug 11	9:08a	421	5
Aug 12	1:22p	438	8
Aug 12	2:50p	444	8
Aug 12	5:51p	456	3
Aug 12	6:03p	457	1

Output of Cost Calculator:

1. **One Net Savings(sm)** (Current Plan of customer)

Fixed Cost: $0.0
Plus Repeating: $0.0
Period: peak Running Sum Cost = $12.51
Period: offpeak Running Sum Cost = $17.49
Plus Variable: $30.0

Plan: (InState) OneNet-PA (subplan1)
Fixed Cost: $0.0
No Variable or Repeating usage for this Type of Service

Plan: (StateToState) OneNet-StateToState (subplan2)
Fixed Cost: $0.0
Plus Repeating: $0.0
Period: peak Running Sum Cost = $2.51
Period: offpeak Running Sum Cost = $7.49
Plus Variable: $30.0

FIG. 13a

FIG. 13b

2. **.05 Anytime**
   Fixed Cost: $8.95
   Plus Repeating: $8.95
   Period: One Rate Running Sum Cost = $9.650001
   Plus Variable: $18.6

3. **Sprint Sense Anytime 1** Fixed Cost: $0.0
   Plus Repeating: $0.0
   Period: One Rate Running Sum Cost = $19.300001
   Plus Variable: $19.300001

4. **Sprint Sense Anytime 2**
   Fixed Cost: $4.95
   Plus Repeating: $4.95
   Period: One Rate Running Sum Cost = $19.300001
   Plus Variable: $24.25

5. Talk.com .05 all the time
   Fixed Cost: $5.95
   Plus Repeating: $5.95
   Period: One Rate Running Sum Cost = $9.650001
   Plus Variable: $15.6

Output of Ranker:

The Ranker sorts the plans by the costs calculated. It runs on the above 5 plans and comes up with plans in ascending sorted order to be
plan 5 **(Talk.com .05 all the time)**
plan 2 **(.05 Anytime)**
plan 3 **(Sprint Sense Anytime 1)**

Overall Output:

Type	Plan	Current Spend	Plans	Projected Spend	Savings
LD	MCI	$30.0	Talk.com .05 all the Time	$15	46%
			.05 Any Time	$18	36%
			Sprint Sense Anytime	$19	36%

MCI WorldCom Account: 2UXXX Statement Date
Telephone: 215 555-1212 July 21, 1999

Customer Service: www.mci.com/service Page 1 of 5

Summary of Charges

Current Charges..... $38.85

Total added to your American Express Card $38.85

Payment Due Date..... PAY CREDIT CARD

Get online today for just $16.95 a month! Exclusive offer for MCI WorldCom long distance customers. E-mail, instant messaging and more! Includes 150 hours of local access each month. Call 1-800-500-1382, or visit www.mciworld.com for availability and offer details.

DO NOT send payment to MCI WorldCom. PLEASE PAY AMERICAN EXPRESS DIRECTLY.

Please call MCI WorldCom to update any new credit card information.

19107514686

#BWNBMMR #2U849701UR000000# 623 *3318*97*36**

Are You MOVING?
If so please contact customer service to update your account.

FIG. 14a

PHILLIP SMITH
1 MAIN STREET
PHILADELPHIA, PA 19103

MCI WorldCom Account: **2UXXX** Statement Date
Telephone: **215-555-1212** July 21, 1999

Customer Service: www.mci.com/service Page 2 of 5

Correspondence and Internet Access
Written Inquiries: MCI WorldCom, P.O. Box 4600, Iowa City, IA 52244-4600

Online Account Manager from MCI WorldCom: www.mci.com/service

Credit Card Payments
If the processing of your credit card payment for your MCI WorldCom charges is unsuccessful, your account will be converted to direct remit billing, requiring payment by check. If this occurs and you wish to re-establish the convenience of credit card billing, please call us at 1 800 879-4737 to provide your credit card information.

Your account at your fingertips! Online Account Manager from MCI WorldCom (sm) is the easiest, most convenient way to manage your account, 24 hours a day, 7 days a week! - Review your current and prior invoices - Update your personal and account information - See your current services or add new products and services - Read our Frequently Asked Questions or send a question via e-mail Check out www.mci.com/service today!

Invoice Continues on Next page

MOVING? Simply provide your new address and telephone number below and we'll be sure

FIG. 14b

your MCI WorldCom account moves with you. If you currently don't have all of the specific information, please provide the date you plan on moving.

Check here if change of address only and complete information below.

Name _____ ( ) - Current Phone Number

Address _____ ( ) - New Phone Number

City _____ State ____ Zip ____ Move Date: _____

Check here if you want MCI WorldCom as your carrier at this new number and sign below. By signing, I authorize MCI WorldCom to transfer my services from my old telephone number to the New Phone Number listed above. I authorize MCI WorldCom to provide my residential long distance, and local toll service, if available, and to notify my local phone company of my choice for the phone number(s) listed above. I understand that I can only have one primary carrier for each of these services per telephone number, and my local telephone company may charge a small fee for this or any other change.

SIGNATURE (Required) x _____ DATE

PLEASE SEND ME _____ MCI WORLDCOM CARD(S) FOR MY NEW NUMBER.

MCI WorldCom Account: 2U8XXX Statement Date
Telephone: 215-555-1212 July 21, 1999

Customer Service: www.mci.com/service Page 3 of 5

Service Summary

Long Distance.....	$30.98
International Long Distance.....	$.98
	$31.96

All telecommunications carriers are required to contribute to the Federal Universal Service Fund. As of July 1, 1999, this required contribution is increasing.

FIG. 14c

SUBSTITUTE SHEET (RULE 26)

Taxes and Surcharges.....	$6.89
Current Charges	$38.85

MCI WorldCom collects its contribution to the fund in a Federal Universal Service Fee (FUSF). This fee, assessed on your state-to-state and international long distance calls, will change to 7.2% on July 1, 1999.

Long Distance
Calls from 215 733-0352:

Date	Time	Place	Number	Rate	Min	Amount
Jun 21	8:05p	Norfolk, VA	757 491-2220	24Hr	14	1.26
Jun 21	8:19p	Richmond, VA	804 673-1212	24Hr	1	.09
Jun 22	11:03a	Arlington, VA	703 974-6329	24Hr	1	.09
Jul 2	8:13p	Richmond, VA	804 673-1212	24Hr	1	.09
Jul 2	8:15p	Norfolk, VA	757 624-8458	24Hr	15	1.35
Jul 3	3:52a	Arlington, VA	703 974-7668	24Hr	4	.36
Jul 3	4:00a	Alexandria, VA	703 933-7380	24Hr	1	.09
Jul 3	4:03a	Arlington, VA	703 974-7668	24Hr	1	.09
Jul 3	4:35a	Arlington, VA	703 974-7668	24Hr	1	.09
Jul 3	4:50a	Bishoprnch, CA	925 358-7634	24Hr	2	.18
Jul 3	4:58a	Bishoprnch, CA	925 358-7634	24Hr	3	.27
Jul 3	10:31a	Vienna, VA	703 620-9368	24Hr	2	.18
Jul 3	10:33a	Alexandria, VA	703 823-1139	24Hr	3	.27
Jul 3	10:37a	Fls Church, VA	703 237-0635	24Hr	1	.09
Jul 3	11:45a	Norfolk, VA	757 624-8458	24Hr	10	.90
Jul 3	11:57a	Schenctady, NY	518 371-0707	24Hr	45	4.05
Jul 3	12:42p	Round Lake, NY	518 899-2760	24Hr	16	1.44
Jul 3	6:26p	Berwyn, MD	301 595-1386	24Hr	3	.27
Jul 3	6:56p	Berwyn, MD	301 595-1386	24Hr	1	.09
Jul 4	3:03p	Bel Air, MD	410 836-7802	5Scent	2	.10
Jul 5	1:21p	Alexandria, VA	703 823-1139	24Hr	1	.09
Jul 5	2:16p	Arlington, VA	703 974-0696	24Hr	2	.18
Jul 5	3:12p	Arlington, VA	703 974-0696	24Hr	1	.09
Jul 5	9:12p	Alexandria, VA	703 751-5665	24Hr	3	.27
Jul 6	11:42a	Arlington, VA	703 741-2150	24Hr	1	.09
Jul 6	4:21p	Alexandria, VA	703 820-9741	24Hr	1	.09
Jul 6	4:22p	Arlington, VA	703 741-2150	24Hr	1	.09
Jul 6	5:38p	Arlington, VA	703 974-7563	24Hr	1	.09
Jul 6	5:56p	Arlington, VA	703 974-7563	24Hr	1	.09

See your MCI WorldCom bill online! Online Account Manager is the best way to manage your MCI WorldCom account and add new services, 24 hours a day, 7 days a week. Go to www.mci.com/service today!

FIG. 14d

Jul 7	9:38a	Berwyn, MD	301 595-8434	24Hr	1	.09
Jul 7	12:28p	Richmond, VA	804 343-5041	24Hr	1	.09
Jul 7	1:31p	Arlington, VA	703 741-2150	24Hr	1	.09
Jul 7	1:33p	Norfolk, VA	757 640-1700	24Hr	1	.09

Invoice Continues
on Reverse ...

MCI WorldCom Account: **2U8XXX** Statement Date
Telephone: **215-555-1212** July 21, 1999

Long Distance (continued)

Calls from 215 733-0352:

Date	Time	Place	Number	Rate	Min	Amount
Jul 7	1:39p	Richmond, VA	804 343-5041	24Hr	3	.27
Jul 7	1:45p	Berwyn, MD	301 902-8737	24Hr	1	.09
Jul 7	1:56p	Norfolk, VA	757 640-1700	24Hr	12	1.08
Jul 7	2:20p	Berwyn, MD	301 595-8434	24Hr	1	.09
Jul 7	3:37p	Arlington, VA	703 741-2150	24Hr	9	.81
Jul 7	3:55p	Berwyn, MD	301-595-1322	24Hr	1	.09
Jul 7	4:25p	Arlington, VA	703 974-7668	24Hr	2	.18
Jul 7	4:46p	Arlington, VA	703 741-2150	24Hr	1	.09
Jul 7	4:54p	Arlington, VA	703 741-2150	24Hr	1	.09
Jul 7	4:55p	Arlington, VA	703 741-2150	24Hr	1	.09
Jul 7	4:56p	Berwyn, MD	301 595-8434	24Hr	1	.09
Jul 7	5:53p	Bishoprnch, CA	925-358-7395	24Hr	1	.09
Jul 7	6:05p	Bishoprnch, CA	925 358-7395	24Hr	1	.09
Jul 7	7:18p	Richmond, VA	804 673-1212	24Hr	3	.27
Jul 7	7:22p	Richmond, VA	804 673-1212	24Hr	9	.81
Jul 8	8:16a	Berwyn, MD	301 595-8434	24Hr	1	.09
Jul 8	9:07a	Berwyn, MD	301 595-8434	24Hr	1	.09

FIG. 14e

Jul 8	9:14a	Berwyn, MD	301 595-8534	24Hr	3	.27
Total Calls from 215 733-0352						$17.47
Calls from 703 751-5665:						
Date	Time	Place	Number	Rate	Min	Amount
Jul 6	7:39p	Phila, PA	215 733-0352	24Hr	5	.45
Jul 6	8:56p	Phila, PA	215-733-0352	24Hr	7	.63
Jul 7	6:21p	Phila, PA	215-733-0352	24Hr	2	.18
Jul 7	6:23p	Charlotsvl, VA	804 984-5291	Peak	1	.25
Jul 7	8:32p	Phila, PA	215 733-0352	24Hr	15	1.35
Jul 7	9:16p	Phila, PA	215 733-0352	24Hr	3	.27
Jul 10	1:40p	Phila, PA	215 205-0336	24Hr	2	.18
Jul 10	2:06p	Richmond, VA	804 744-3977	Ofpk	1	.10
Jul 10	2:32p	Richmond, VA	804 744-3977	Ofpk	5	.50
Jul 10	8:53p	Norfolk, VA	757 624-8458	Ofpk	20	2.00
Jul 11	9:53a	Richmond, VA	804 673-1212	Ofpk	1	.10
Jul 11	10:16a	Schenctady, NY	518 371-0707	Scent	1	.05
Jul 11	4:01p	Norfolk, VA	757 624-8458	Ofpk	1	.10
Jul 11	4:02p	Richmond, VA	804 673-1212	Ofpk	11	1.10
Jul 12	7:55p	Cleveland, OH	216 707-1898	24Hr	20	1.80
Jul 17	9:54a	Norfolk, VA	757 624-8458	Ofpk	3	.30
Jul 18	4:10p	Fayettevl, NC	910 223-9474	Scent	42	2.10
Jul 18	5:36p	Richmond, VA	804 673-1212	Ofpk	16	1.60
Jul 18	6:55p	Balacynwyd, PA	610 949-9777	Scent	9	.45
Total Calls from 703 751-5665						$13.51
Total Long Distance						$30.98

Invoice Continues
on Next page ...

MCI WorldCom Account: 2U8XXX Statement Date
Telephone: 215-555-1212 July 21, 1999

FIG. 14f

International Long Distance

Calls from 703 751-5665:

Date	Time	Place	Number	Rate	Min	Amount
Jul 7	6:23p	Germany	4969288387	Ecnmy	1	.98
Total Calls from 703 751-5665						$.98
Total International Long Distance						$.98

Taxes and Surcharges

Long Distance Services

Federal Excise Tax.....	$1.06
State & Local Taxes.....	$2.45
Federal, State & Local Surcharges.....	$.37
National Access Fee.....	$1.07
Federal Universal Service Fee.....	$1.94

Partner airline customers may notice a slight increase in their surcharges. This is the result of a federally imposed Federal Excise Tax (FET) on airline miles which MCI WorldCom passes to airline partner customers in the form of a minimal surcharge when the miles have been posted to the airline account. Questions? Please call 1-800-569-5905.

Total Taxes and Surcharges $6.89

Key to Rate Codes:

24 Hr = Call Priced at 24-Hour Rate
Ofpk = Call priced at Off Peak rate
Peak = Call priced at Peak rate
Scent = 5 cent Rate
Ecnmy = Call Priced at Economy Rate

For Your Information ...

ENSURE YOU KEEP YOUR MCI WORLDCOM BENEFITS!
Simply call your local phone company today and request that your local toll and long distance service not be switched to another company without your verbal or written authorization.

FIG. 14g

Take a look at any enclosed special value offers just for MCI WorldCom customers.

FIG. 14h

2.0 XML Format of AT&T Wireless bill

```
<bill name = "ATTWireless">

<keyword_format>Account Name Date of Invoice Page</keyword_format>
<keyword_format>Account Number Telephone Number</keyword_format>
<keyword_format>Total Current Monthly Charges</keyword_format>
<keyword_format>MONTHLY SE</keyword_format>
<keyword_format>TEXT MESSAGING</keyword_format>
<keyword_format>CALLER ID</keyword_format>
<keyword_format>TOTAL MONTHLY SERVICE CHARGES</keyword_format>
<keyword_format>TOTAL MONTHLY CHARGES</keyword_format>
<keyword_format>REF DATE TIME</keyword_format>


<Account_Name_Date_of_Invoice_Page></Account_Name_Date_of_Invoice_Page>
<carriage_return></carriage_return><word
store="Account__name"></word><whitespace></whitespace>
<word store=" Account_name"></word><whitespace></whitespace>
<date store="bill_date"></date>
<garbage></garbage>

<Account_Number_Telephone_Number></Account_Number_Telephone_Number>
<carriage_return></carriage_return><numeral store="Account_number"></numeral>
<whitespace></whitespace>
<telephone store=" Customer_tel_No"></telephone>
<garbage></garbage>

<Total_Current_Monthly_Charges></Total_Current_Monthly_Charges>
<garbage></garbage><whitespace></whitespace>
<dollar_value store="Total_Monthly_charges"></dollar_value>
<garbage></garbage>

<MONTHLY_SE></MONTHLY_SE><whitespace></whitespace>
<multi_word store="plan_name"></multi_word><whitespace></whitespace>
<dollar_value store="plan_name"></dollar_value><whitespace></whitespace>
<word store="plan_name"></word><whitespace></whitespace>
<dollar_value store="plan_cost"></dollar_value>
<garbage></garbage>
```

FIG. 15a

```
<TEXT_MESSAGING></TEXT_MESSAGING><whitespace></whitespace>
<dollar_value store="voicemail_charges"></dollar_value>

<CALLER_ID></CALLER_ID><whitsepace></whitespace>
<dollar_value store="caller_id_charges"></dollar_value>
<garbage></garbage>

<group>
            <or>
         <TOTAL_MONTHLY_SERVICE_CHARGES>
           </TOTAL_MONTHLY_SERVICE_CHARGES><whitespace></whitespace>
         <dollar_value_store="caller_id_charges"></dollar_value>
  <garbage></garbage>
 </or>
 <or>
  <TOTAL_MONTHLY_CHARGES>
  </TOTAL_MONTHLY_CHARGES><whitespace></whitespace>
  <dollar_value store="caller_id_charges"></dollar_value>
  <garbage></garbage>
 </or>
</group>
<section>
 <garbage></garbage>
 <table>
  <header> </header>
  <REF_DATE_TIME></REF_DATE_TIME>
   <row>
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    <date store="call_date"></date><whitespace></whitespace>
    <time store="call_time"></time><whitespace></whitespace>
    <telephone store="dialed_number"></telephone>
    <whitespace></whitespace>
    <word store="city"></word><whitespace></whitespace>
    <state_code
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    <numeral
    store="category"></numeral><whitespace></whitespace>
    <numeral store="duration"></numeral>
    <carriage_return></carriage_return>
   </row>
   <row>
```

FIG. 15b

```
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<date store="call_date'></date><whitespace></whitespace>
<time store="call_time"></time><whitespace></whitespace>
<telephone store="dialed_number"></telephone>
<whitespace></whitespace>
<word store="city"></word><whitespace></whitespace>
<state_code
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<numeral
store="category"></numeral><whitespace></whitespace>
<numeral
store="duration"></numeral><whitespace></whitespace>
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</row>
<row>
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<date store="call_date"></date><whitespace></whitespace>
<time store="call_time".,/time><whitespace></whitespace>
<telephone store="dialed_number"></telephone>
<whitespace></whitespace>
<word store="city"></word><whitespace></whitespace>
<state_code
store="state"></state_code><whitespace></whitespace>
<numeral
store="category"></numeral><whitespace></whitespace>
<numeral
store="duration"></numeral><whitespace></whitespace>
<numeral store="air"></numeral><whitespace></whitespace>
<numeral store="long_distancer"></long_distance>
<carriage_return></carriage_return>
</row>
<row store="varname">
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<date store="call_date></date><whitespace></whitespace>
<time store="call_time"></time><whitespace></whitespace>
<INCOMIING></INCOMING><whitespace></whitespace>
<numeral
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<numeral
```

FIG. 15c

```
   store="duration"></numeral><whitespace></whitespace>
    <carriage_return></carriage_return>
   </row>
   <row store="varname">
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    <date store="call_date"></date><whitespace></whitespace>
    <time store="call_time"></time><whitespace></whitespace>
    <MSG-RETRIEVALMOBILE></MSG_RETRIEVALMOBILE
   ><whitespace></whitespace>
    <numeral
   store="category"></numeral><whitespace></whitespace>
    <numeral
   store="duration"></numeral><whitespace></whitespace>
    <carriage_return></carriage_return>
   </row>
  </table>
 </section>
</bill>
```

FIG. 15d

Account Name Date of Invoice
APR 22, 2000 1

Account Number

SUMMARY OF MONTHLY CHARGES FOR ACCOUNT 52175965
Previous Balance 190.07
Payments Received Through 4/22/00 190.07CR
Adjustments 9.55CR
Balance Forward 9.55CR
Late Payment Charge .00
Total Balance Forward
9.55CR
Current Monthly Charges

Current Monthly charges are summarized on the following pages, including a subtotal of charges for each telephone number. Billing detail for each telephone number follows this information.

Total Current Monthly Charges DUE UPON RECEIPT
190.13
TOTAL AMOUNT DUE
180.58
AT&T WIRELESS SERVICES APPRECIATES YOUR BUSINESS
P.O. BOX 289, ATTN: CORRESPONDENCE DEPARTMENT, PARAMUS,NJ 07653-0289
Billing Inquiries Call Customer Care 1-800-888-7600
or dial 611 free from your cellular telephone
PAYMENT DUE UPON RECEIPT AMOUNT DUE:
180.58

Acct Name: AT&T WIRELESS SERVICES
P.O. BOX 8220
AURORA IL 60572-8220

00000003000250000000521759654756000180580

FIG. 15e

2.0

--- BLANK ---

FIG. 15f

ACCOUNT NAME ACCOUNT NUMBER BILL DATE

3.0 APR 22, 2000

Introducing Online Customer Service

It's easy to get information about your wireless account with our Online Custom
er Service.
Simply go to www.att.com/wireless and select Customer Service. Once you regist
er, you'll
be able to view your account balance or billing history, add or delete features

Figure 15f

FIG. 15g

, make
credit card payments, and get the latest on calling plans, features, coverage a
reas,
accessories, and more. It's just another way AT&T Wireless Services is working
to
simplify your life by simplifying Wireless.

PAYMENTS AND ADJUSTMENTS
DETAIL OF PAYMENTS

4/01/00 PAYMENT		190.07CR
TOTAL OF PAYMENTS RECEIVED THROUGH 4/22/00		
190.07CR		
DETAIL OF ADJUSTMENTS		
NATIONAL ACCOUNT DISCOUNT		9.55CR
TOTAL OF ADJUSTMENTS		
9.55CR		
CURRENT MONTHLY CHARGES		
		35.13
		155.86
FEDERAL TAXES	@ 3.000%	.29CR
STATE TAXES	@ 6.000%	.57CR
TOTAL CURRENT MONTHLY CHARGES		
190.13		

FIG. 15h

4.0

--- BLANK ---

ACCOUNT NAME ACCOUNT NUMBER MOBILE NUMBER BILL DATE
5.0
APR 22, 200

SUMMARY OF CHARGES
MONTHLY SERVICE CHARGES
3/20/00 Through 4/19/00
MONTHLY SE - AT&T ADVANTAGE PLUS $29.9 29.99
3-WAY CONFERENCE 1.00
CALLER ID .00
VOICEMAIL PLUS & TEXT MESSAGING .00
TOTAL MONTHLY SERVICE CHARGES
30.99
HOME AIRTIME CHARGES
3/20/00 Through 4/19/00 - AT&T ADVANTAGE PLUS $29.99

Category	Minutes	Rate	Charge
INCLUDED IN PLAN	145	.000	.00

TOTAL HOME AIRTIME CHARGES
.00
HOME LONG DISTANCE CHARGES

Local Carrier Charge (x) 6.12
AT&T WIRELESS SERVICES .75
TOTAL HOME LONG DISTANCE CHARGES

FIG. 15i

6.87
OTHER CHARGES AND CREDITS

LOCAL CARRIER CHARGE - NO CHARGE		6.12CR
TOTAL OTHER CHARGES AND CREDITS		
6.12CR		
TAXES, SURCHARGES & REGULATORY FEES		
FEDERAL TAX	@ 3.000%	.95
STATE TAX	@ 6.000%	1.94
UNIVERSAL CONNECTIVITY CHARGE		.50
TOTAL TAXES, SURCHARGES & REGULATORY FEES		
3.39		
TOTAL CURRENT MONTHLY CHARGES		
35.13		

FIG. 15j

ACCOUNT NAME ACCOUNT NUMBER MOBILE NUMBER BILL DATE

6.0

APR 22, 2000

HOME AIRTIME AND LONG DISTANCE CHARGES

REF	DATE	TIME	NUMBER CALLED	CALLS TO	CALL FROM	CAT	MIN	AIR	LONG DISTANCE
0001	3/20	3:00P	S908/NACN	PERTHAMBOY	NJ				
0002	3/20	3:00P	NACN	INCOMING		MM	B	3	
0003	3/20	7:19P	732-310-8000	DUNELLEN	NJ	MM	1	1	.060x
0004	3/21	11:13A	732-445-4568	NEWBRUNSWK	NJ	MM	1	1	.060x
0005	3/21	11:17A	732-310-8000	DUNELLEN	NJ	MM	1	1	.060X
0006	3/21	11:41A	S908/NACN	PERTHAMBOY	NJ	MM	1	1	
0007	3/21	11:41A	NACN	INCOMING		MM	B	2	
0008	3/21	5:23P	732-249-1070	LOCAL		MM	1	1	
0009	3/21	4:31P	732-310-8000	DUNELLEN	NJ	MM	1	2	.120x
0010	3/22	10:37A	732-310-8000	DUNELLEN	NJ	MM	1	2	.120x
0011	3/22	7:13P	732-310-8000	DUNELLEN	NJ	MM	1	1	.060x
0012	3/22	7:19P	732-249-1070	NEWBRUNSWK	NJ	MM	1	1	.060x
0013	3/22	7:19P	732-932-9611	NEWBRUNSWK	NJ	MM	1	1	.060x
0014	3/22	7:30P	732-445-4568	NEWBRUNSWK	NJ	MM	1	1	.060x
0015	3/23	11:23A	632-310-8000	DUNELLEN	NJ	MM	1	2	.120x
0016	3/23	11:24A	732-445-4568	NEWBRUNSWK	NJ	MM	1	2	.120x
0017	3/23	10:29P	732-418-8766	NEWBRUNSWK	NJ	MM	2	1	.060x
0018	3/23	10:29P	732-310-8000	DUNELLEN	NJ	MM	2	1	.060x

FIG. 15k

```
0019 3/23 10:30P  732-418-8766   LOCAL          MM 2     1
0020 3/23 10:45P  732-418-8766   NEWBRUNSWK NJ  MM 2     1
.060x
0021 3/23 10:45P  732-310-8000   DUNELLEN  NJ   MM 2     1
.060x
0022 3/24  9:05A NDEPOSIT        LOCAL
0023 3/24  9:39A  609-919-9756   PRINCETON  NJ  MM 1     1
:060x
0024 3/24  5:11P  732-828-3131   LOCAL          MM 1     1
0025 3/25  4:18P  732-310-8000   DUNELLEN   NJ  MM 3     1
.060x
0026 3/27  4:59P  732-310-8000   DUNELLEN   NJ  MM 1     1
.060x
0027 3/27  5:07P  732-418-8900   NEWBRUNSWK NJ  MM 1     1
.060x
0028 3/27  5:08P  732-418-8900   NEWBRUNSWK NJ  MM 1     2
.120x
0029 3/29  9:30A  732-418-8900   NEWBRUNSWK NJ  MM 1     1
.060x
0030 3/29  9:31A  732-418-8900   NEWBRUNSWK NJ  MM 1     1
.060x
0031 3/29  9:32A  732-310-8000   DUNELLEN   NJ  MM 1     1
.060x
0032 3/29  9:33A  609-520-0404   PRINCETON  NJ  MM 1     3
.180x
0033 3/29  9:36A  609-520-0404   PRINCETON  NJ  MM 1     1
.060x
0034 3/29  9:36A  609-520-0404   PRINCETON  NJ  MM 1     3
.180x
0035 3/29 11:00A  609-529-4846   MOBILE         MR 1     1
0036 3/29 11:01A  732-310-8000   DUNELLEN   NJ  MR 1     2
.120x
0037 3/29 11:06A S609/NACN       LAWRNCVLLE NJ
0038 3/29 11:07A  NACN           INCOMING       MR B     2
0039 3/29  3:42P S908/NACN       PERTHAMBOY NJ
0040 3/29  3:42P  NACN           INCOMING       MM B     1
0041 3/30  4:53P S908/NACN       PERTHAMBOY NJ
0042 3/30  4:53P  NACN           INCOMING       MM B     2
0043 3/30 10:25P  732-310-8000   DUNELLEN   NJ  MM 2     2
.120x
```

FIG. 151

```
0044 3/30 10:53P  732-310-8000   DUNELLEN   NJ  MM 2     2
.120x
0045 3/31 11:23A  732-445-4568   NEWBRUNSWK NJ  MM 1     1
.060x
```

FIG. 15m

ACCOUNT NAME ACCOUNT NUMBER MOBILE NUMBER BILL DATE

7.0

APR 22, 2000

REF	DATE	TIME	NUMBER CALLED	CALLS TO	CALL FROM	CAT	MIN	AIR	LONG DISTANCE
0046	4/01	1:05P	732-310-8000	DUNELLEN	NJ	MM	3	2	.120x
0047	4/01	1:07P	732-310-6382	DUNELLEN	NJ	MM	3	1	.060x
0048	4/01	5:19P	732-310-8000	DUNELLEN	NJ	MM	3	1	.060x
0049	4/01	5:20P	215-568-9331	PHILA	PA	MM	3	1	.150
0050	4/03	10:22A	S908/NACN	PERTHAMBOY	NJ				
0051	4/03	10:22A	NACN	INCOMING		MM	B	1	
0052	4/03	11:38A	732-310-8000	DUNELLEN	NJ	MM	1	1	.060x
0053	4/03	2:58P	732-310-8000	DUNELLEN	NJ	MM	1	1	.060x
0054	4/04	11:28A	732-310-8000	DUNELLEN	NJ	MM	1	1	.060x
0055	4/04	11:33A	S908/NACN	PERTHAMBOY	NJ				
0056	4/04	11:33A	NACN	INCOMING		MM	B	2	
0057	4/04	12:48P	732-310-8000	DUNELLEN	NJ	MM	1	2	

FIG. 15n

```
.120x
0058 4/04  5:41P  732-310-8000   DUNELLEN    NJ  MM 1     1
.060x
0059 4/04  5:44P  732-418-8900   NEWBRUNSWK  NJ  MM 1     1
.060x
0060 4/04  5:45P  732-296-9097   NEWBRUNSWK  NJ  MM 1     1
.060x
0061 4/05 12:54P  732-418-8766   NEWBRUNSWK  NJ  MM 1     4
.240x
0062 4/05  4:32P S908/NACN       PERTHAMBOY  NJ
0063 4/05  4:32P  NACN           INCOMING        MM B     2
0064 4/05  4:56P S908/NACN       PERTHAMBOY  NJ
0065 4/05  4:57P  NACN           INCOMING        MM B     2
0066 4/05  9:48P  732-418-8766   NEWBRUNSWK  NJ  MM 2     1
.060x
0067 4/05  9:49P  732-418-8766   NEWBRUNSWK  NJ  MM 2     1
.060x
0068 4/05  9:50P  732-418-8766   NEWBRUNSWK  NJ  MM 2     1
.060x
0069 4/06  7:42A  732-418-8766   NEWBRUNSWK  NJ  MM 1     2
.120x
0070 4/06  7:44A  732-445-0781   NEWBRUNSWK  NJ  MM 1     1
.060x
0071 4/06 11:46A NDEPOSIT        LOCAL
0072 4/06  4:45P  215-568-9331   PHILA       PA  MM 1     2
.300
0073 4/06  4:48P  732-310-6382   DUNELLEN    NJ  MM 1     1
.060x
0074 4/06  8:07P  732-310-8000   DUNELLEN    NJ  MM 1     1
.060x
0075 4/06  8:13P FDEPOSIT        LOCAL
0076 4/06  8:13P FDEPOSIT        LOCAL
0077 4/07  5:13P  732-310-8000   DUNELLEN    NJ  MM 1     1
.060x
0078 4/07  5:51P                 INCOMING            B     1
0079 4/07  5:52P  732-310-8000   DUNELLEN    NJ  MM 1     1
.060x
0080 4/07  5:53P S908/NACN       PERTHAMBOY  NJ
0081 4/07  5:53P  NACN           INCOMING        MM B     2
```

FIG. 15o

```
0082 4/07  6:13P  609-919-9756   PRINCETON  NJ     1      1
0083 4/07  6:14P FDEPOSIT        LOCAL
0084 4/07  6:15P S908/NACN       PERTHAMBOY NJ
0085 4/07  6:15P  NACN           INCOMING       MM B     7
0086 4/10 10:22A  732-310-8000   DUNELLEN   NJ  MM 1     1
.060x
0087 4/10 11:00A  732-445-1999   NEWBRUNSWK NJ  MM 1     2
.120x
0088 4/10 11:02A  732-445-1999   NEWBRUNSWK NJ  MM 1     1
.060x
0089 4/10  2:30P S908/NACN       PERTHAMBOY NJ
0090 4/10  2:30P  NACN           INCOMING       MM B     1
```

FIG. 15p

ACCOUNT NAME ACCOUNT NUMBER MOBILE NUMBER BILL DATE

8.0

APR 22, 2000

REF	DATE	TIME	NUMBER CALLED	CALLS TO	CALL FROM	CAT	MIN	AIR	LONG DISTANCE
0088	4/10	11:02A	732-445-1999	NEWBRUNSWK	NJ	MM	1	1	
0091	4/10	3:28P	S908/NACN	PERTHAMBOY	NJ				
0092	4/10	3:28P	NACN	INCOMING		MM	B	1	
0093	4/10	3:59P	732-310-8000	DUNELLEN	NJ	MM	1	1	

.060x

FIG. 15q

```
0094 4/10  7:18P  732-310-8000   MOBILE              1     2
0095 4/11  6:44P  732-310-8000   DUNELLEN   NJ  MM 1     1
.060x
0096 4/11  6:45P  732-310-8000   DUNELLEN   NJ  MM 1     1
.060x
0097 4/11  6:46P  609-919-9756   PRINCETON  NJ  MM 1     1
.060x
0098 4/11  6:47P  609-919-9756   PRINCETON  NJ  MM 1     5
.300x
0099 4/11  7:02P S908/NACN       PERTHAMBOY NJ
0100 4/11  7:02P  NACN           INCOMING       MM B     1
0101 4/13  7:56A  732-445-0781   NEWBRUNSWK NJ  MM 1     1
.060x
0102 4/13 11:45A NDEPOSIT        LOCAL
0103 4/13 11:47A  215-568-9331   PHILA      PA  MM 1     1
.150
0104 4/13 11:52A FDEPOSIT        LOCAL
0105 4/13 12:04P  732-418-8900   NEWBRUNSWK NJ  MM 1     1
.060x
0106 4/13 12:04P  732-249-0011   NEWBRUNSWK NJ  MM 1     2
.120x
0107 4/13 12:06P  732-310-8000   DUNELLEN   NJ  MM 1     1
.060x
0108 4/13 12:07P  732-310-6382   DUNELLEN   NJ  MM 1     1
.060x
0109 4/13 12:48P  732-310-8000   DUNELLEN   NJ  MM 1     5
.300x
0110 4/14 11:30A  732-310-8000   DUNELLEN   NJ  MM 1     3
.180x
0111 4/14  6:43p  732-310-8000   DUNELLEN   NJ  MM 1     1
.060x
0112 4/14  6:44P  732-310-8000   DUNELLEN   NJ  MM 1     2
.120x
0113 4/14  6:51P FDEPOSIT        LOCAL
0114 4/15 10:38A NDEPOSIT        LOCAL
0115 4/15 10:40A NDEPOSIT        LOCAL
0116 4/17 11:19A  408-735-9558   SUNNYVALE  CA  MM 1     1
.150
0117 4/17 11:21A  732-310-8000   DUNELLEN   NJ  MM 1     2
.120x
```

FIG. 15r

0118 4/18 11:15A 732-310-8000 DUNELLEN NJ MM 1 1
.060x
0119 4/18 12:17P S908/NACN PERTHAMBOY NJ
0120 4/18 12:17P NACN INCOMING MM B 1
0121 4/18 12:41P 732-310-8000 DUNELLEN NJ MM 1 1
.060x
TOTAL HOME AIRTIME AND LONG DISTANCE CHARGES 145 .00
6.87
CALL CHARACTERISTICS:
S = Long Distance Service Billed Separately,
x = Local Carrier Charge, see Summary for Details,
N = No Answer Transfer, F = Call Forwarding
"CALLS FROM" KEY:
MM = Monmouth/Middlesex NJ, MR = Mercer CO NJ
IF YOU HAVE ANY QUESTIONS CONCERNING YOUR INVOICE OR SERVICE,
PLEASE CALL OUR CUSTOMER CARE DEPARTMENT: 1-800-888-7600
ACCOUNT NAME ACCOUNT NUMBER MOBILE NUMBER BILL DATE
9.0
APR 22, 2000
SUMMARY OF CHARGES
MONTHLY SERVICE CHARGES
3/22/00 Through 4/19/00
MONTHLY SE - AT&T DIGITAL ONE RATE $14 149.99
CALLER ID .00

FIG. 15s

VOICEMAIL PLUS & TEXT MESSAGING .00
TOTAL MONTHLY SERVICE CHARGES
149.99
HOME AIRTIME CHARGES
3/20/00 Through 3/30/00 - AT&T DIGITAL ONE RATE $149.99

Category	Minutes	Rate	Charge
INCLUDED IN PLAN	354	.000	.00

3/31/00 Through 4/19/00 - AT&T DIGITAL ONE RATE $149.99

Category	Minutes	Rate	Charge
INCLUDED IN PLAN	931	.000	.00

TOTAL HOME AIRTIME CHARGES
.00
OTHER CHARGES AND CREDITS

7.5% CORPORATE DISCOUNT 7.50CR
TOTAL OTHER CHARGES AND CREDITS
7.50CR
TAXES, SURCHARGES & REGULATORY FEES

FEDERAL TAX	@ 3.000%	4.29
STATE TAX	@ 6.000%	8.58
UNIVERSAL CONNECTIVITY CHARGE		.50

TOTAL TAXES, SURCHARGES & REGULATORY FEES
13.37
TOTAL CURRENT MONTHLY CHARGES
155.86

FIG. 15t

ACCOUNT NAME ACCOUNT NUMBER MOBILE NUMBER BILL DATE

10.0

APR 22, 2000

HOME AIRTIME AND LONG DISTANCE CHARGES

REF	DATE	TIME	NUMBER CALLED	CALLS TO	CALL FROM	CAT	MIN	AIR	LONG DISTANCE
0112	4/14	6:44P	732-310-8000	DUNELLEN		NJ MM	1	2	
0001	3/20	8:46A	267-251-6999	MOBILE		PA	1	2	
0002	3/20	7:03P	215-568-9334	PHILA	PA	PA	1	8	
0003	3/20	7:11P	215-568-9334	PHILA	PA	PA	1	14	
0004	3/20	7:19P	WNACN	INCOMING		PA	B	1	
0005	3/21	9:15A	NACN	INCOMING		PA	B	1	
0006	3/21	9:25A	NACN	INCOMING		PA	B	5	
0007	3/21	11:07A	NDEPOSIT	LOCAL					
0008	3/21	11:18A	NDEPOSIT	LOCAL					
0009	3/21	11:40A	732-310-8000	DUNELLEN	NJ	PA	1	1	
0010	3/21	11:41A	732-310-6382	DUNELLEN	NJ	PA	1	2	
0011	3/21	3:22P	NACN	INCOMING		PA	B	1	
0012	3/21	3:27P	800-454-9272	800 SERV.		PA	1	7	
0013	3/21	3:30P	WNACN	INCOMING		PA	B	1	
0014	3/21	5:31P	NACN	INCOMING		PA	B	2	
0015	3/21	7:01P	732-418-8766	NEWBRUNSWK	NJ	PA	1	5	
0016	3/21	7:06P	215-417-8068	PHILA	PA	PA	1	4	
0017	3/21	7:10P	215-417-8068	PHILA	PA	PA	1	1	
0018	3/21	7:11P	215-568-9334	PHILA	PA	PA	1	8	
0019	3/21	7:19P	609-865-2285	MOBILE		PA	1	1	
0020	3/21	7:21P	800-862-4569	800 SERV.		PA	1	2	
0021	3/21	7:52P	732-418-8766	NEWBRUNSWK	NJ	NJ	1	1	
0022	3/21	9:16P	215-563-9070	PHILA	PA	NJ	2	1	
0023	3/21	9:17P	215-568-9334	PHILA	PA	NJ	2	9	
0024	3/22	10:38A	NACN	INCOMING		PA	B	1	
0025	3/22	2:00P	610-650-8100	TROOPER	PA	PA	1	2	
0026	3/22	4:04P	NACN	INCOMING		PA	B	1	

FIG. 15u

0027	3/22	7:08P	NACN	INCOMING		PA	B	4
0028	3/22	7:12P	215-568-9334	PHILA	PA	PA	1	14
0029	3/22	7:13P	WNACN	INCOMING		PA	B	1
0030	3/22	7:27P	215-568-9334	PHILA	PA	PA	1	8
0031	3/22	7:38P	203-223-6358	STAMFORD	CT	NJ	1	2
0032	3/22	7:39P	732-418-8766	NEWBRUNSWK	NJ	NJ	1	3
0033	3/22	7:55P	609-865-2285	PRINCETON	NJ	NJ	1	1
0034	3/22	7:55P	609-919-9756	PRINCETON	NJ	NJ	1	6
0035	3/23	11:23A	NACN	INCOMING		PA	B	1
0036	3/23	6:59P	215-568-9334	PHILA	PA	PA	1	12
0037	3/23	7:16P	215-568-9334	PHILA	PA	PA	1	8
0038	3/23	7:24P	215-417-8068	PHILA	PA	PA	1	2
0039	3/23	8:02P	FDEPOSIT	LOCAL				
0040	3/23	8:21P	732-310-8000	DUNELLEN	NJ	NJ	1	1
0041	3/23	10:14P	FDEPOSIT	LOCAL				
0042	3/23	10:30P	FDEPOSIT	LOCAL				
0043	3/23	10:45P	FDEPOSIT	LOCAL				
0044	3/23	10:46P	FDEPOSIT	LOCAL				
0045	3/24	8:07A	FDEPOSIT	LOCAL				

FIG. 15v

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/17157

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G 06F 17/60
US CL : 705/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/40

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y,P	US 6,128,603 A (DENT et. al) 03 OCTOBER 2000, Abstract; Fig 1/2/3; col 2 line 65-col 3 line 48; col 4 line 40-col 5 line 12; col 5 line 18-col 6 line 12; col 6 line 30-col 6 line 56; Fig 4/70/38/72/74; col 7 lines 3-55; Fig 5/80/54/38; col 7 line 55-col 8 line 7; Fig 6/70/54; col 8 lines 17-45; col 8 lines 60-67; Fig 7/80/90/94/92; col 9 lines 21-67; col 10 lines 1-52; col 11 lines 4-32; Fig 9/110/116/118	1-21
Y	US 5,978,780 A (WATSON et. al.) 02 NOVEMBER 1999, Abstract; Fig 2/202/203/204/205/208; Fig 4A/Fig 4B/Fig 4C/Fig 4D; col 1 line 48-col 3 line 17; col 4 line 14-col 5 line 32; col 5 line 34-col 9 line 24; col 13 line 25-col 14 line 14	1-21

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"B"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 06 AUGUST 2001	Date of mailing of the international search report 05 SEP 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer Peggy Hamad VINCENT MILLIN Telephone No. (703) 308-1065

Form PCT/ISA/210 (second sheet) (July 1998) ★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/17157

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,956,700 A (LANDRY et al) 21 SEPTEMBER 1999, Abstract; Figs 1-25B; col 6 line 36-col 8 line 5; col 9 line 1-col 11 line 47; col 11 line 64-col 12 line 65; col 13 lines 11-34; col 13 line 61-col 14 line 64; col 15 line 16-col 17 line 55; col 19 line 25-col 20 line 17	1-21